Global Competitiveness of Indian Pharmaceutical Industry: Trends and Strategies

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Abstract

[What are the trends in the global competitiveness of the Indian pharmaceutical industry? Where does this industry stand when compared to global peers on pharmaceutical value-added, productivity, research and development and trade performance? What are the new strategies that Indian pharmaceutical companies are adopting to become global players? These questions are addressed in this paper. It is found that strategic government policies were the main factors that transformed the status of the Indian pharmaceutical industry from a mere importer and distributor of drugs and pharmaceuticals to an innovation-driven cost-effective producer of quality drugs. India emerged as one of the fast growing pharmaceutical industry in the world with growing trade surpluses and exports. However, there are certain limitations that the government policies need to address, like low productivity and R&D intensity. A host of competitive strategies, like greenfield direct investment, overseas acquisitions, strategic alliances and contract manufacturing have emerged as favourites to Indian pharmaceutical firms recently.]

JEL Classification:

L65; D24; O30; F14; L20; L22; G34.

Keywords

Indian Pharmaceutical Industry; Productivity; Innovation; Trade; Strategic Alliances; Foreign Investment; M&As.

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Global Competitiveness of Indian Pharmaceutical Industry: Trends and Strategies

Jaya Prakash Pradhan[*]

1. Introduction

In the process of industrialization, pharmaceuticals have been a favourite sector for policy makers in the developed as well in many developing countries, including India. This special policy preference has been due to the criticality of the pharmaceutical products for the health security of the populace as well as for developing strategic advantages in the knowledge-based economy. However, not all developing countries succeeded in enhancing local capabilities in the sector. The growth of the pharmaceutical industry in the developing region is largely confined to a few countries like India, China, Singapore, Korea, Czech Republic, Brazil, and Argentina. Among these countries, most often the case of Indian pharmaceutical industry is projected as the most successful case of a developing country scaling up the indigenous capabilities (e.g. Kumar 2003).

The Indian pharmaceutical industry, which had little technological capabilities to manufacture modern drugs locally in the 1950s, has emerged technologically as the most dynamic manufacturing segment in the Indian economy in the 1990s (Kumar and Pradhan 2003). It achieved a significant scale and level of technological capability for manufacturing modern drugs indigenously and cost-efficiently to emerge as a major developing country competitor in the world market. It indigenously meets up to 70 per cent of the domestic requirement of bulk drugs and almost all the demands for formulations, thus, restricting imports from developed countries into India[1]. Besides, it generates rising trade surpluses in pharmaceutical products by exporting to over 65 countries[2], therefore, significantly competing with developed countries for global market

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[1] Department of Chemicals and Petrochemicals (2000), *Annual Report 1999—2000*, Ministry of Chemicals and Fertilizers, Government of India, New Delhi.

[2] Organization of Pharmaceutical Producers of India (2004), 'Indian Pharmaceutical Industry-Fact Sheet– 2004', available at http://www.indiaoppi.com/keystat.htm

share. It produces life-saving drugs belonging to all major therapeutic groups at a fraction of prices existing in the world market and thus, has been seen as ensuring health security of the poorer countries[3]. The Annual Report 1999–2000 of the Department of Chemicals and Petrochemicals, Government of India, describes it as one of the largest and most advanced among developing countries. The industry today posseses the largest number of US Food & Drug Administration (FDA) approved manufacturing facilities outside the US and has filed 126 Drug Master Files (DMFs) with the US FDA for drug exports to the US, which is higher than that filed by Spain, Italy, China and Israel taken together[4].

The phenomenal progress made by the industry over the last three decades has instilled a strong belief in the government and the pharmaceutical companies in India that the country has a competitive strength and it should be enhanced by suitable policy measures and firm-specific actions with regard to export, innovation, strategic alliances and investment. The Pharmaceutical Policy 2002 echoes the same sentiment and has shifted the focus of the policy from self-reliance in drugs manufacturing to the objective of enhancing global competitiveness. The introduction of the Policy says:

> "The basic objectives of Government's Policy relating to the drugs and pharmaceutical sector were enumerated in the Drug Policy of 1986. These basic objectives still remain largely valid. However, the drug and pharmaceutical industry in the country today faces new challenges on account of liberalization of the Indian economy, the globalization of the world economy and on account of new obligations undertaken by India under the WTO Agreements. These challenges require a change in emphasis in the current pharmaceutical policy and the need for new initiatives beyond those enumerated in the Drug Policy 1986, as modified in 1994, so that policy inputs are directed more towards promoting accelerated growth of the pharmaceutical industry and towards making it more internationally competitive. The need for radically improving the policy framework for knowledge-based industry has also been acknowledged by the

[3] The recent example is the offer of Indian pharmaceutical companies to provide lower-priced AIDS drugs in Africa and other developing countries. In 2001, an Indian drug company, Cipla Ltd, has offered a combination of three AIDS drugs for $600 per patient per year to governments and for $350 per patient per year to, Doctors Without Borders, an international nonprofit organization operating in the developing region. These prices are much lower as compared to the annual cost of AIDS-drug combinations in the U.S. and Europe which ranges between $10,000 to $12,000. Zimmerman, R and J. Pesta (2001), 'Drug Industry, AIDS Community is Jolted by Cipla AIDS-Drug Offer', *Wall Street Journal*–February 8, 2001.

[4] Deccan Herald (2005), 'Drug patent: A Viagra for Indian pharmaceutical industry', April 4.

Government. The Prime Minister's Advisory Council on Trade and Industry has made important recommendations regarding knowledge-based industry. The pharmaceutical industry has been identified as one of the most important knowledge based industries in which India has a comparative advantage[5]."

Against the above backdrop of increasing attention of the policy makers on global competitiveness of the Indian pharmaceutical sector, the present study shall make an attempt to put the performance of the sector in a global setting. Most of the recent studies on Indian pharmaceutical industry deal with the impact of economic liberalization and new global intellectual property rights (IPR) regime on industry performance like R&D and patenting, foreign investment, exports, and drugs prices and public health (e.g., Watal, 1996; Lanjouw, 1998; Pradhan, 2002a, b, 2006; Fink, 2000; Lalitha, 2002; Kumar and Pradhan, 2003; among others). However, the issue of global competitiveness of the industry is still not rigorously addressed. How does Indian pharmaceutical industry perform in a global setting? This issue, in turn, involves a comparative analysis of the Indian pharmaceutical industry in a cross-country setting and exploring its growth, productivity, technology and trade performance *vis-à-vis* global peers in the sector and an analysis of new competitive strategies that Indian firms are adopting to compete in the global market.

The study is structured into the following sections: Section 2 provides an overview of the evolution of Indian pharmaceutical industry. The competitive strength of Indian pharmaceutical industry is examined in section 3 within a cross-country analysis. Section 4 looks into new competitive strategies that emerged as most preferred among Indian pharmaceutical companies to become global players. Section 5 concludes the paper.

2. Evolution of Indian Pharmaceutical Industry

The pharmaceutical production in India began in 1910s when private initiatives established Bengal Chemical and Pharmaceutical Works in Calcutta and Alembic Chemicals in Baroda and setting up of pharmaceutical research institutes for tropical diseases like King Institute of Preventive Medicine, Chennai (in Tamil Nadu), Central Drug Research Institute, Kasauli (in Himachal Pradesh), Pastures Institute, Coonoor (in Tamil Nadu), etc. through British initiatives. The nascent industry, however, received setbacks in the post World War II period as a result of new therapeutic developments in the Western countries that triggered natural elimination of the older drugs from the

[5] Pharmaceutical Policy 2002, Press Information Bureau Releases, February 15, 2002, available at http://www.nppaindia.nic.in/ceiling/policy.htm

market usage by newer drugs like sulpha, antibiotics, vitamins, harmones, antihistamine, tranquilizers, psycho pharmacological substances, etc. This culminated in the discontinuation of local production based on indigenous materials and forced the industry to import bulk drugs meant for processing them into formulations and for selling in the domestic market.

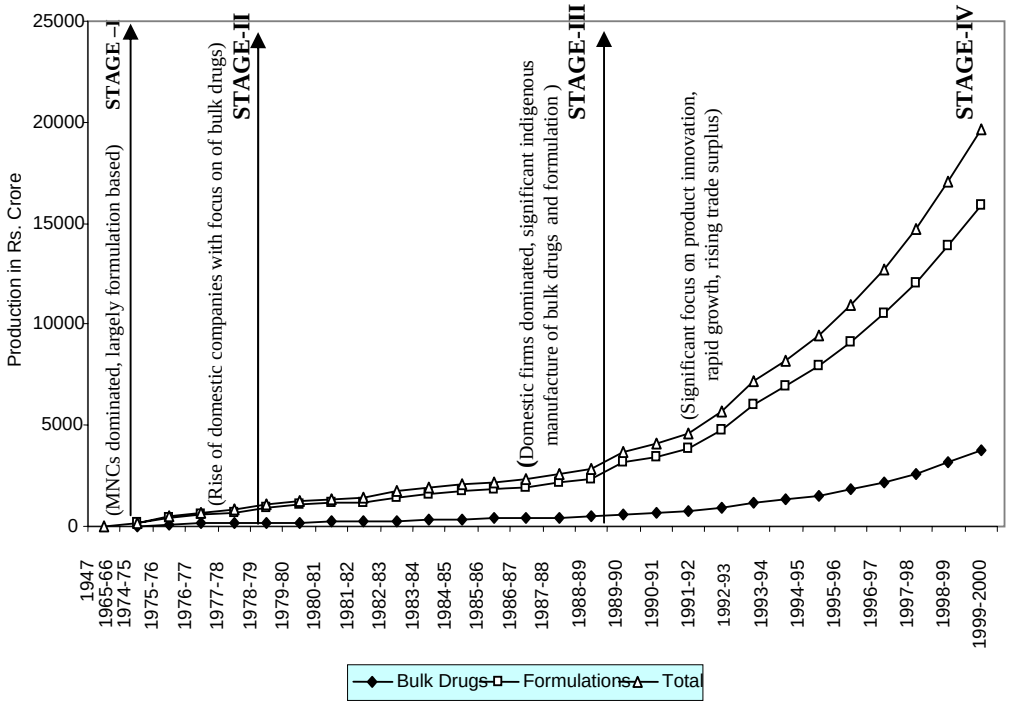
2.1. The Stages of Growth

In the post-independence period, Indian pharmaceutical industry exhibited four stages of growth (see Figure 1). In the first stage during 1950s–60s, the industry was largely dominated by foreign enterprises and it continued to rely on imported bulk drugs notwithstanding its inclusion in the list of 'basic industries' for plan targeting and monitoring. Foreign firms, enjoying a strong patent protection under the Patent and Design Act 1911, were averse to local production and mostly opted for imports from home country as working of the patent. Given the inadequate capabilities of the domestic sector to start local production of bulk drugs and hesitation of foreign firms to do so, the government decided to intervene through starting public sector enterprises. This led to the establishment of the Indian Drugs and Pharmaceuticals Ltd. (IDPL) plants at Rishikesh and Hyderabad in 1961 and the Hindustan Antibiotics at Pimpri, Pune, in 1954 to manufacture penicillin. The starting of the public sector enterprises has been an important feature in the evolution of the pharmaceutical industry as it assumed initiative roles in producing bulk drugs indigenously and led to significant knowledge spillovers on the private domestic sector.

The second growth stage of the industry took place in the 1970s. The enactment of the Indian Patent Act (IPA) 1970 and the New Drug Policy (NDP) 1978 during this stage are important milestones in the history of the pharmaceutical industry in India. The IPA 1970 brought in a number of radical changes in the patent regime by reducing the scope of patenting to only processes and not pharmaceutical products and also for a short period of seven years from the earlier period of 16 years. It also recognizes compulsory licensing after three years of the patent. The enactment of the process patent contributed significantly to the local technological development via adaptation, reverse engineering and new process development. As there exits several ways to produce a drug, domestic companies innovated cost–effective processes and flooded the domestic market with cheap but quality drugs. This led to the steady rise of the domestic firms in the market place. The NDP 1978 has increased the pressure on foreign firms to manufacture bulk drugs locally and from the basic stage possible. Foreign ownership up to 74 per cent under the Foreign Exchange Regulation Act (FERA) 1973 was permitted to only those firms producing high technology drugs. Foreign firms that are simply producing

formulations based on imported bulk drugs were required to start local production from the basic stage within a two year period. Otherwise were required to reduce their foreign ownership holding to 40 per cent. New foreign investments were to be permitted only when the production involves high technology bulk drugs and formulations thereon.

Figure 1
Stages of Growth of the Indian Pharmaceutical Industry



Source: Stage classification is based on the Report of the Pharmaceutical Research and Development Committee (PRDC) November 1999. Production data is from Organization of Pharmaceutical Producers of India and the Department of Chemicals and Petrochemicals, Annual Reports, various years.

The outcomes of the strategic government interventions in the form of a soft patent policy and a regime of discrimination against foreign firms affected the industry with a time lag and provided strong growth impetus to the domestic sector during 1980s. In the third stage of its evolution, domestic enterprises based on large-scale reverse engineering and process innovation achieved near self-sufficiency in the technology and production of bulk drugs belonging to several major therapeutic groups and have developed modern manufacturing facilities for all dosage forms like tablets, capsules, liquids, orals and injectibles and so on. These had a lasting impact on the competitive position of the

domestic firms in the national and international markets. In 1991, domestic firms have emerged as the main players in the market with about 70 and 80 per cent market shares in the case of bulk drugs and formulations respectively (Lanjouw, 1998). The industry turns out to be one of the most export-oriented sectors in Indian manufacturing with more than 30 per cent of its production being exported to foreign markets (Kumar and Pradhan, 2003). The trade deficits of the seventies have been replaced by trade surpluses during 1980s (Table 1).

The growth momentum unleashed by the strategic policy initiatives continued in the fourth stage of the evolution of the industry during 1990s. The production of bulk drugs and formulations have grown at very high rates and the share of bulk drugs in total production has gone up to 19 per cent in 1999–2000 from a low of 11 per cent in 1965–66 (Figure 1). This stage has also witnessed dramatic changes in the policy regime governing the pharmaceutical industry. The licensing requirement for drugs has been abolished, 100 per cent foreign investment is permitted under automatic route, and the scope of price control has been significantly reduced. India has carried out three Amendments in March 1999, June 2002 and April 2005 on the Patent Act 1970 to bring Indian patent regime in harmony with the WTO agreement on Trade Related Intellectual Property Rights (TRIPs). The third and the final one, known as the Patents (Amendment) Act, 2005 came into force on 4th April 2005 and introduced product patents in drugs, food and chemicals sectors. The term of patenting has been increased to a 20 year period. These changes in the policy regime in the 1990s, thus, started a new chapter in the history of Indian pharmaceutical sector where free imports, foreign investment and technological superiority would determine the trade patterns and industrial performance. The Indian pharmaceutical industry is looking at this era of globalization as both an opportunity and a challenge.

Table 1

India's Trade in Pharmaceutical Products, 1970–71 to 1999–2000

Year	*Trade in Medicinal & Pharmaceutical Products (Rs. Crore)*			*Pharmaceutical as a % of India's total manufactured exports*
	Exports	*Imports*	*Trade balance*	
1970–71	9	24	–16	1.0
1971–72	10	27	–17	1.1
1972–73	10	23	–13	1.0
1973–74	15	26	–11	1.1
1974–75	23	34	–11	1.3
1975–76	22	36	–14	1.1
1976–77	24	42	–18	0.8
1977–78	31	64	–32	1.0
1978–79	57	79	–23	1.6
1979–80	88	74	14	2.3
1980–81	67	85	–17	1.7
1981–82	122	84	38	2.6
1982–83	112	89	23	2.5
1983–84	155	147	8	3.1
1984–85	234	137	97	3.8
1985–86	158	177	–19	2.5
1986–87	161	214	–53	2.1
1987–88	326	168	158	3.1
1988–89	474	236	237	3.2
1989–90	850	400	450	4.3
1990–91	1014	468	546	4.3
1991–92	1550	559	992	4.8
1992–93	1533	813	720	3.8
1993–94	2010	809	1201	3.8
1994–95	2512	937	1575	3.9
1995–96	3409	1358	2051	4.3
1996–97	4342	1089	3253	5.0
1997–98	5419	1447	3972	5.5
1998–99	6256	1615	4641	5.8
1999–2000	6631	1502	5129	5.2

Source: Reserve Bank of India (2000), *Hand Book of Statistics on Indian Economy*, Bombay.

3. Comparative Analysis of the Competitive Strength of the Indian Pharmaceutical Industry

With the arrival of global patent regime and widespread liberalization measures at the individual country, bilateral, regional and multi-lateral levels, the issue of competitiveness is critical for understanding the strengths and weaknesses of a country in the global market place. The discussion in the previous section provides strong support for the view that strategic government policies can have a long-term impact on the growth and structure of an industry. This view is known as the strategic trade theory in international economics. The relevance of government policy continues to be critical even in an era of liberalization and this holds for knowledge-based industries in developing countries. For example, the government promotion of local technological activities through fiscal or other incentives is always needed when free market forces are not capable of scaling up the developing country's capabilities in high technology-intensive industries. Once it is known where a country lacked in competitiveness *vis-à-vis* others, then the concerned government can take facilitating policy measures to address the inadequacy. In what follows, an assessment of the competitiveness of Indian pharmaceutical industry is presented.

The competitive strength of an industry in the global market can be seen in several ways. One simple way is to compare the relative size and growth performance in value-added. A stronger growth performance exhibited by a particular industry in cross country comparisons indicates rising level and strength of production, which may drive the sector to emerge as a global player. Most of the studies on cross–country and industry level comparisons of competitiveness also emphasized on the productivity level. In order to achieve a relatively higher growth performance among countries, one country in the particular sector is required to produce relatively more output per input combination over time and among competing countries. Innovation is an important source of cross–country differences in the productivity performance. This is especially true in the case of knowledge-based industries like pharmaceuticals. Hence, a comparison of the level of innovation can also, to a certain extent, measure the competitive strength of the sector. The export market share and import coverage of the export (i.e. import to export ratio) are also important indicators of competitive strength. An industry doing very well in the international market suggests that it is scaling up its supplier position *vis-à-vis* other competitors and in fact possesses a strong comparative advantage in the product. The present section looks into the trends in above mentioned indicators to examine the global competitive strength of the Indian pharmaceutical industry.

3.1. Growth and Relative Size

Table 2 provides a picture of growth performance among eighteen selected countries in the pharmaceutical sector since late 1970s. The growth rate[6] of global pharmaceutical value-added has consecutively slowed down and has fallen from an estimated rate of 25 per cent in 1980–85 to 18.74 per cent in 1990–95 and further to 15.8 per cent in 1995–2000.

Table 2
Growth of Pharmaceutical Industry in India vis–à–vis in Other Countries, 1975–2000, PPP $

Country	*Compound Growth Rate (%) of Pharmaceutical Gross Value–added*				
	1975–80	*1980–85*	*1985–90*	*1990–95*	*1995–00*
Austria		17.84	36.68	14.32	16.93
Belgium		19.37	24.23	27.34	21.77
Canada	30.36	45.56	29.56	8.92	2.31
Denmark	31.91	41.86	25.46	29.08	36.79
Finland		24.45	19.44	7.64	7.73
France	17.10	21.13	16.49	18.13	15.49
Germany		14.85	18.94	32.69	11.38
India	19.48	24.10	31.55	41.32	28.31
Italy		21.86	20.27	0.61	21.16
Japan		20.93	21.97	9.49	4.59
Korea	31.07	39.79	34.48	27.50	9.37
Mexico		24.23	28.21	24.58	25.94
Netherlands		43.42	-12.55	43.32	12.88
Norway	57.01	25.21	47.40	37.13	8.33
Spain		13.31	25.23	2.25	4.33
Sweden		38.49	22.12	44.15	29.87
UK		24.49	27.29	10.32	11.08
USA		30.38	28.41	23.18	19.22
All Above Countries		25.09	24.71	18.74	15.80

Note: The growth rate has been obtained from the semi-log regression model of the form: LogY=a+bt, where growth rate = (antilog b-1)*100. The pharmaceutical gross value-added is at the PPP $ (Purchasing Power Parity) million.

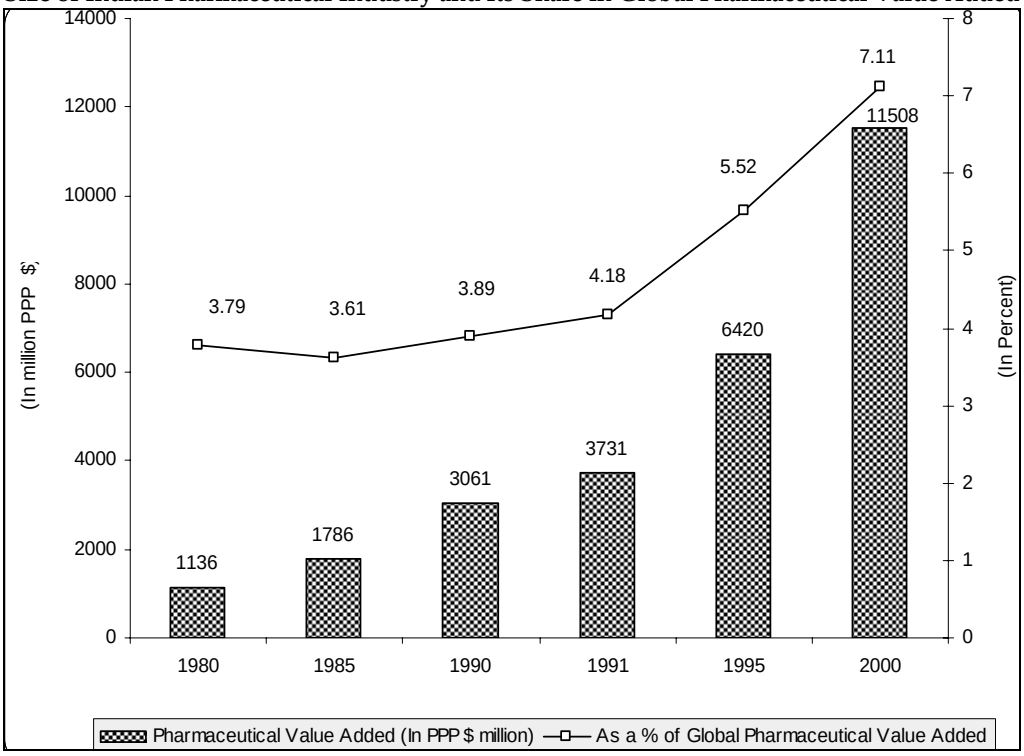
Source: Pharmaceutical value added in local currency for India and other countries have been obtained from the Central Statistical Organization, ASI, various years and OECD, STAN Database 2004 respectively. The PPP conversion ratio for Indian currency has been collected from the WDI CD-ROM, 2002 and that for other countries from OECD 2004.

[6] In calculating these growth rates and also labour productivity at a later stage, we have converted cross-country value added using PPP rates of currency conversion. This approach is more sensible for international comparisons of value added or productivity than using market exchange rates which suffered from daily fluctuations and do not reflect the relative prices of goods and services produced in a country (they are affected by the relative prices of tradable goods and by factors such as interest rates, financial flows, etc.).

Given the absence of blockbuster innovations in the last two decades, it is logical to expect a downward trend in the growth performance of the technology-driven pharmaceutical sector. Contrary to the slow-down of the global trends, Indian pharmaceutical sector turns out to be one of the fastest growing industries in the global market place. In 1980–85, there are ten countries surpassing India's growth performance, which has fallen to only three countries in 1985–90 and just two in 1990–2000. It has grown at a phenomenal rate of 41 and 28 per cent per year during 1990–95 and 1995–00 respectively, standing as the third largest growing pharmaceutical industry amongst the selected countries. The rapid rise of India in the late 1980s can be partly attributed to the suitable policy measures including a soft patent regime that the Indian government adopted during 1970s and partly to the growth of generic segment in world pharmaceutical market following the off-patenting of a number of drugs in the late 1990s. The off-patenting phenomenon helped many Indian firms enter the generic-space of international market with their own cost-effective processes and the rise of a few Indian companies like Ranbaxy, Dr Reddy and Cipla to market their own formulations after obtaining US-FDA approval.

As a result of the consistently higher growth performance in the last two decades, the size of Indian pharmaceutical industry has increased impressively with significant gains in the share of world pharmaceutical value-added. India's share of value-added nearly doubled between 1980 and 2000, from 3.79 per cent to become 7.11 per cent (Figure 2 and Table 3). The size of Indian pharmaceutical industry is estimated to be about PPP $ 11508 million in 2000, which is about 43 times the size of Austria, 36 times the size of Norway and 10 times the size of Australia! It is even larger than the combined size of Austria, Belgium, Canada, Denmark, Finland, Netherlands and Norway! The size of the Indian pharmaceutical industry would have been even much larger since the unorganized segment of the industry has not been taken into account in the study. Therefore, Indian pharmaceutical industry has achieved a high level of growth performance and a scale that is comparable to the global peers.

Figure 2
Size of Indian Pharmaceutical Industry and Its Share in Global Pharmaceutical Value Added



Source: Based on Table 3

3.2. Productivity

The relatively rapid growth of output may not be sufficient to ensure competitiveness of a country in the long run unless there is sustained increase in the efficiency with which resources are employed in value-added activity. Productivity is a key determinant of competitiveness, especially in a technology-intensive industry like pharmaceuticals. Those countries that produce increased value-added per unit of inputs overtime *vis-à-vis* other countries are sure to perform better in the international market. Table 4 presents inter-temporal performance of a group of countries with respect to labour productivity, which measures the amount of value-added generated for per person employed.

Table 3

Size of Indian pharmaceutical industry *vis-à-vis* selected countries, 1980–2000, PPP $

Year	*Pharmaceutical Value Added (In PPP $ million)*						*As a % of Global Pharmaceutical Value Added*					
	1980	*1985*	*1990*	*1991*	*1995*	*2000*	*1980*	*1985*	*1990*	*1991*	*1995*	*2000*
Austria	174 (15)	260 (16)	523 (15)	595 (15)	752 (16)	1129 (16)	0.58	0.53	0.66	0.67	0.65	0.70
Belgium	482 (11)	677 (13)	1005 (12)	1110 (12)	1805 (12)	2819 (11)	1.61	1.37	1.28	1.24	1.55	1.74
Canada	409 (12)	964 (11)	1695 (11)	1751 (11)	2043 (11)	2338 (13)	1.36	1.95	2.15	1.96	1.76	1.44
Denmark	132 (16)	286 (15)	481 (16)	566 (16)	877 (15)	1611 (15)	0.44	0.58	0.61	0.63	0.75	1.00
Finland	93 (17)	159 (17)	197 (17)	221 (17)	240 (17)	269 (18)	0.31	0.32	0.25	0.25	0.21	0.17
France	2170 (4)	3408 (4)	4809 (5)	5333 (6)	7189 (4)	9679 (4)	7.24	6.89	6.11	5.97	6.18	5.98
Germany	1648 (6)	2250 (6)	3243 (6)	6304 (3)	7408 (3)	9514 (5)	5.49	4.55	4.12	7.05	6.37	5.88
India	1136 (8)	1786 (7)	3061 (7)	3731 (7)	6420 (6)	11508 (3)	3.79	3.61	3.89	4.18	5.52	7.11
Italy	2757 (3)	4151 (3)	6119 (3)	6073 (4)	6055 (7)	9043 (6)	9.19	8.39	7.77	6.80	5.21	5.59
Japan	6718 (2)	10334 (2)	15612 (2)	16166 (2)	19236 (2)	21511 (2)	22.40	20.89	19.83	18.09	16.54	13.29
Korea	779 (10)	1492 (9)	2775 (8)	3030 (8)	4520 (8)	6235 (8)	2.60	3.02	3.53	3.39	3.89	3.85
Mexico	798 (9)	1283 (10)	2182 (10)	2159 (10)	3433 (9)	5512 (9)	2.66	2.59	2.77	2.42	2.95	3.41
Netherlands	319 (13)	733 (12)	585 (14)	705 (14)	1304 (14)	1682 (14)	1.06	1.48	0.74	0.79	1.12	1.04

Table 3 Continued

Year	*Pharmaceutical Value Added (In PPP $ million)*						*As a % of Global Pharmaceutical Value Added*					
	1980	1985	1990	1991	1995	2000	1980	1985	1990	1991	1995	2000
Norway	32 (18)	53 (18)	124 (18)	118 (18)	238 (18)	323 (17)	0.11	0.11	0.16	0.13	0.20	0.20
Spain	1189 (7)	1691 (8)	2633 (9)	2981 (9)	3027 (10)	3448 (10)	3.96	3.42	3.34	3.34	2.60	2.13
Sweden	244 (14)	486 (14)	749 (13)	955 (13)	1650 (13)	2683 (12)	0.81	0.98	0.95	1.07	1.42	1.66
UK	2076 (5)	3317 (5)	5452 (4)	5733 (5)	6689 (5)	8401 (7)	6.92	6.71	6.93	6.42	5.75	5.19
USA	8835 (1)	16130 (1)	27477 (1)	31833 (1)	43441 (1)	64122 (1)	29.46	32.61	34.90	35.62	37.34	39.62
All Above Countries	29992	49460	78723	89362	116329	161828	100	100	100	100	100	100

Note: The figure for Germany up-to 1990 includes only that of Western Germany. The figure in parenthesis is the cross-country ranking in value-added.

Source: Pharmaceutical employment and value added in local currency for India and other countries have been obtained from the Central Statistical Organization, Annual Surveys of Industries, various years and OECD, STAN Database 2004 respectively. The PPP conversion ratio for Indian currency has been collected from the World Development Indicator CD-ROM, 2002 and that for other countries from OECD 2004.

It can be seen that the Indian pharmaceutical sector has experienced high rates of productivity growth in 1990s as compared to its performance in 1980s. In the year 2000, the industry generated about PPP $49242 of value-added per unit of labour, which is more than four-times the value added generation in the year 1980 (PPP $10660). How did the Indian pharmaceutical sector perform as compared to others in terms of productivity? It appears that relative productivity of Indian pharmaceutical sector is one of the lowest in the world and continued to be so between 1980 and 2000. The series on relative labour productivity presented in Table 4 suggests that for each PPP $100 of the value-added that USA generated per person employed in 1980, India could generate only about PPP $26. The relative productivity of India in relation to the US has fallen to PPP $19 in 1985 and remained stagnant between 1990 and 1995, ahead of an improvement to reach PPP $23 in 2000.

This shows that India's impressive growth in value-added as observed in the previous sub-section is not accompanied by a commensurate rise in the level of relative productivity in terms of the cross–country analysis. The fragmented nature of Indian pharmaceutical sector characterized by the operation of a very large number of players, estimated to be about 10,000 units of which just 300 units are medium and large-sized[7], may be a reason for low level of productivity. The other important factor for low productivity can be due to the nature of technological activities in the sector, which tends to rely more on process than product development. Further, it may be that Indian companies are focusing at the low end of value-chains in the pharmaceuticals like producing generics than opting for branded products or supply bulk drugs to global players than market formulations of their own.

This low productivity performance of India in comparison to global peers suggests that the country has to improve the quality of innovation, scale and focus on high value added segment of pharmaceutical production. Addressing these factors is very important for enhancing India's global competitiveness. It should be mentioned that low labour productivity of India as compared to the US does not necessarily reflect that India is sliding on the path of global competition since higher value addition in the US reflect higher compensation to labour and capital in the form of higher wages to skilled labour and charging higher profit margins and taxes on capital. In India, domestic companies are known to have lower profit margin because of charging lower prices for drugs and Indian skilled manpower works at much lower wages than what their counterparts get in the US.

[7] Organization of Pharmaceutical Producers of India, (2004) 'Indian Pharmaceutical Industry-Fact Sheet– 2004', available at http://www.indiaoppi.com/keystat.htm

Table 4
Labour Productivity in Pharmaceutical Industry, PPP $

Country	*Level of Labour Productivity (In PPP $)*					*Relative Labour Productivity (USA=100)*				
	1980	*1985*	*1990*	*1995*	*2000*	*1980*	*1985*	*1990*	*1995*	*2000*
Austria	24857	32099	56848	76735	99912	60	41	48	48	47
Belgium				116452	154890				73	73
Canada	22722	50737	77045	92864	86593	55	65	66	58	41
Denmark	21639	34048	44537	73083	125859	53	44	38	46	59
Finland	32069	42973	48049	57143	64048	78	55	41	36	30
France	37414	52431	67732	101254	140275	91	67	58	63	66
Germany	18727	24457	33092	65558	79283	46	31	28	41	37
Italy	38831	58465	70333	82945	108952	94	75	60	52	51
Japan	59982	85405	129025	163017	174886	146	110	110	102	82
Netherlands			39262	89931	103827			33	56	49
Norway	18824	26500	56364	76774	89722	46	34	48	48	42
Spain	30487	43359	62690	75675	88410	74	56	53	47	42
Sweden	20333	34964	53885	113793	154195	49	45	46	71	73
India	10660	15076	22756	31138	49242	26	19	19	19	23
USA	41093	77923	117423	160299	212325	100	100	100	100	100

Source: Pharmaceutical employment and value added in local currency for India and other countries have been obtained from the Central Statistical Organization, Annual Surveys of Industries, various years and OECD, STAN Database 2004 respectively. The PPP conversion ratio for Indian currency has been collected from the World Development Indicator CD-ROM, 2002 and that for other countries from OECD 2004.

3.3. Innovation

Several studies on the economics of technological change and technology gap approach to international trade (e.g., Fegerberg 1987, Verspagen 1991) have brought out that growth performance and competitive advantages of countries go together with their activities of technological innovation and imitation. They have shown that technological development measured by patent and R&D expenditures have significant impact on the trade performance of the countries. The pharmaceutical industry being one of the most technology-intensive industries, the extent and nature of innovation is crucial for countries to prolong their productivity growth and competitiveness in the long run.

In broad terms the process of technological change can occur through improvements in the products, production process, raw material and intermediate inputs, and through enhancements in the efficiency of the management system (Stoneman, 1983). Indian domestic pharmaceutical companies are known for their innovative cost-effective processes, discovery in novel drugs delivery system, self-reliance in producing quality

raw materials and production led by quality management. However, these technological strengths are confined to a few large Indian pharmaceutical companies. As the Indian industry is dominated by a large number of companies, both medium- and small-sized, the research activities in the sector are quite limited and inadequately focused on development of new drugs. Majority of the Indian companies suffered from limitation of financial, technical and skill resources to undertake any kind of R&D activities. A recent study found that in a sample of 223 firms, about 62.3 per cent of firms are not engaged in innovative activities and another 21.1 per cent firms undertake R&D, which is even less than 1 per cent of their sales in the year 1999–2000 (Pradhan, 2002b).

Using R&D as an indicator of technological activities, Table 5 presents the growth rates of pharmaceutical R&D in selected countries. It can be seen that India had consistently pushed up its pharmaceutical R&D expenses since 1987. The Indian pharmaceutical R&D has grown by 17 per cent during the period 1987–91. The growth rate has gone up to 26 and 83 per cent over the periods 1992–96 and 1997–2001 respectively. This high growth rate of India in pharmaceutical R&D seems to be due to the low base of pharmaceutical R&D in the base years. In the period 1997–2001, India turned out to be second highest R&D growing pharmaceutical sector among the selected countries. Moreover, India's R&D relative to the US is also observed to be increasing. For each PPP $100 worth of R&D expenditure incurred by the US pharmaceutical sector in 1990, Indian pharmaceutical sector had incurred just PPP $2 and 40 cents. The relative R&D spending of India in terms of the US spending has gone up to PPP $4 and 80 cents in 2000. Although, there is a vast gap in the amount of pharmaceutical R&D expenses undertaken by the US and India, the relative gap in R&D spending is falling modestly over the years.

The growing trends of R&D expenses may be a good sign but not a sufficient condition to ensure a rising competitiveness for Indian pharmaceutical sector. Unless the sector sets aside an increasing proportion of its value-added for the R&D activities over time and across countries, expanding global position would be difficult. The R&D intensities, the percentage of the value-added devoted for the R&D activities, for a group of countries is furnished in Table 6. Two important points can be deduced from it. First, Indian pharmaceutical industry as compared to global peers incurs a very small fraction of its value-added for research and innovative activities. In 1990, its R&D spending is not even one per cent of the value-added and is the lowest in the cross-country comparison. Second, Indian pharmaceutical industry has significantly improved its R&D intensity in the 1990s. Between 1990 and 2000, its R&D intensity has increased by more than nine-times from 0.91 per cent to 8.7 per cent. In 2000, the R&D intensity of India is higher than that of Korea, Italy and matches that of Spain.

Table 5

Growth of Pharmaceutical R&D, PPP $

Country	*Growth of Pharmaceutical R&D (%)*			*Relative R&D Expenditure (USA=100)*			
	1987–91	*1992–96*	*1997–2001*	*1987*	*1990*	*1995*	*2000*
Australia	19	48	24	1.4	1.3	1.9	1.9
Belgium		42	36	4.5		3.6	5.6
Canada	76	41	23	2.0	3.1	3.6	4.2
Czech Republic		49	74			0.2	0.3
Denmark	51	41		1.9	2.1	2.5	
Finland	17	25	94	0.8	0.7	0.7	1.2
France	31	18	13	18.3	16.9	19.8	19.7
Germany			17			11.9	17.7
India	17	26	83	3.2	2.4	2.9	4.8
Ireland	107	30		0.3	0.4	0.9	
Italy		-15	13			5.8	4.9
Japan	35	10	20	44.2	42.0	37.0	37.1
Korea			70			1.3	1.5
Netherlands	15	26	23	3.7	3.3	2.3	3.3
Norway	48	-7		0.6	0.7	0.5	
Poland			22			0.3	0.3
Spain	47	18	16	2.7	2.9	2.5	2.4
Sweden	48	41	38	4.7	5.4	6.3	9.2
UK	32	11	23	29.4	31.8	27.1	34.1
USA	36	13	5	100	100	100	100

Note: The growth rate has been obtained from the semi-log regression model of the form: LogY=a+bt, where growth rate = (antilog b-1)*100.

Source: R&D expenditure in millions of current PPP $ for pharmaceutical sector of other countries than India have been obtained from the OECD Research and Development Expenditure in Industry database, 1987–2001. The R&D data in local currency for India up to 1995 has been taken from Department of Science and Technology and for later years from Prowess Database of the Centre for Monitoring Indian Economy. Using the PPP conversion ratio for Indian currency has been collected from the World Development Indicator CD-ROM, 2002, the series is then converted into PPP $.

Table 6
Pharmaceutical R&D Intensity (%), 1987–2000, PPP $

Country	*As a % of Pharmaceutical Value-added (%)*			
	1987	*1990*	*1995*	*2000*
Australia				
Belgium	24		20	26
Canada	7	12	18	23
Denmark	22	28	29	
Finland	25	22	30	58
France	18	22	28	26
Germany			16	24
India		0.91	6.24	8.66
Italy			10	7
Japan	14	17	20	22
Korea			3	3
Netherlands	23	35	18	25
Norway	28	36	23	
Spain	6	7	8	9
Sweden	33	45	39	44
UK	29	37	41	52
USA	21	23	24	20

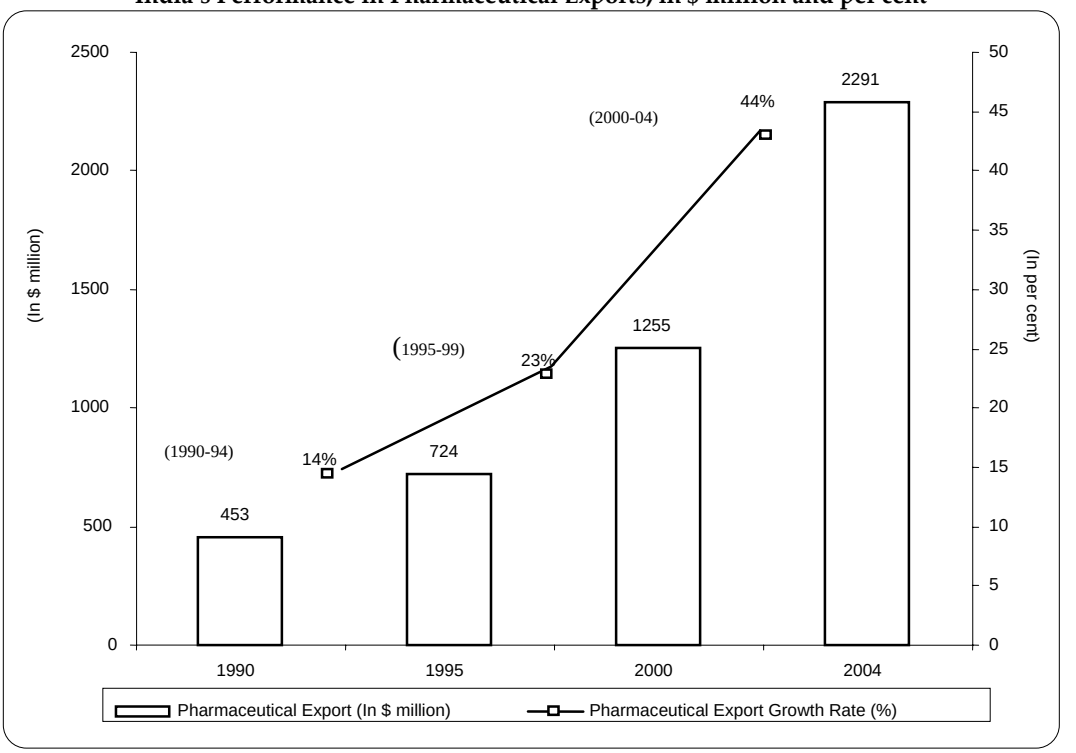
Source: Pharmaceutical value added in local currency for countries other than India have been obtained from OECD, STAN Database 2004 and pharmaceutical R&D expenditure in millions of current PPP $ from the OECD Research and Development Expenditure in Industry database, 1987–2001. Using the PPP conversion ratios collected from OECD 2004, the value added series have been converted into PPP $. The value added and R&D of the Indian pharmaceutical sector has been collected from the Prowess Database (2006) and using the PPP conversion rate for India obtained from World Development Indicators, these series are converted into PPP $.

3.4. Trade Performance

Table 7 and Figure 3 show the pharmaceutical exports of India and its growth rates over the periods 1990–94, 1995–99 and 2000–04. It can be observed that India has increased its pharmaceutical exports at a rapid pace in the 1990s. The total pharmaceutical exports in 2004 stood at US $2.2 billion, nearly five times the figure pertaining to 1990. The exports have consecutively achieved higher growth rates, 14 per cent in 1990–94, 23 per cent in 1995–99 and 44 per cent in 2000–04. In relation to a group of selected twenty-nine countries, India is much ahead of fifteen countries in terms of growth performance in pharmaceutical exports during 2000–04. India's 44 per cent growth rate is higher than that of the US, China, Italy, Indonesia, Malaysia, Mexico, Brazil, Rep. of Korea, Portugal, Japan, Thailand, South Africa, Argentina, Singapore and Hong Kong. However,

irrespective of its impressive export growth rates, India's share in the global pharmaceutical exports has not shown any improvement. In fact, it is hovering around 1 per cent of market share. India's recent export growth rate has not yet translated into gains in export share as India's growth performance is much lower when compared to the 60 per cent growth rate of world pharmaceutical exports during 2000–2004 and also its contribution to the global sum is minimal.

Figure 3
India's Performance in Pharmaceutical Exports, in $ million and per cent



Source: Based on Table 7

Although, India is far from significantly increasing its global export share, it belongs to the selected group of eight countries, which have consistently enjoyed favourable trade balance in pharmaceuticals, i.e. exporting more than the amount being imported, during 1990–2004 (Table 8). These countries are Switzerland, Germany, UK, France, Sweden, Denmark, India and China. India's trade surplus in the pharmaceutical product has increased by eight-times between 1990 and 2004 from a low of US $195 million to $1616 million. As a consequence of rising trade balance, the export to import ratio has increased from 1.75 in 1990 to 3.4 in 2004.

Table 7
Pharmaceutical Exports of Selected Countries, 1990–2004

Country	*Pharmaceutical Export (In $ million)*				*Pharmaceutical Export Growth Rate (%)*			*World Pharmaceutical Export Market Share (%)*			
	1990	*1995*	*2000*	*2004*	*1990–94*	*1995–99*	*2000–04*	*1990*	*1995*	*2000*	*2004*
Argentina		141	309	388		62	8		0.20	0.29	0.16
Belgium			6834	30770			152			6.37	12.56
Brazil	78	168	266	394	31	34	23	0.22	0.23	0.25	0.16
China		1582	1788	3234	38	5	43		2.22	1.67	1.32
Hong Kong		975	725	643	6	-11	-8		1.37	0.68	0.26
Czech Rep.		186	203	481	58	3	59		0.26	0.19	0.20
Denmark	1160	2161	2810	5575	20	13	49	3.30	3.03	2.62	2.28
France	3665	6864	10085	20703	26	26	51	10.43	9.61	9.40	8.45
Germany		10268	12945	33977	22	27	66		14.38	12.07	13.87
India	453	724	1255	2291	13	23	45	1.29	1.01	1.17	0.93
Indonesia	18	41	78	130	41	35	35	0.05	0.06	0.07	0.05
Israel	76	255	429	1359	111	28	87	0.22	0.36	0.40	0.55
Italy	1517	3627	6380	11272	45	26	40	4.32	5.08	5.95	4.60
Japan	877	1844	2732	3540	39	13	17	2.50	2.58	2.55	1.44
Malaysia	37	80	80	131	37	-7	33	0.11	0.11	0.07	0.05
Mexico	89	399	880	1431	103	45	29	0.25	0.56	0.82	0.58
Norway	135	210	240	443	26	3	48	0.38	0.29	0.22	0.18
Poland		224	154	371	80	-23	60		0.31	0.14	0.15
Portugal	95	144	282	383	-1	33	19	0.27	0.20	0.26	0.16
Rep. of Korea	115	259	337	462	43	8	20	0.33	0.36	0.31	0.19
Russian Federation			100	182		-13	54			0.09	0.07

Table 7 Continued

Country	*Pharmaceutical Export (In $ million)*				*Pharmaceutical Export Growth Rate (%)*			*World Pharmaceutical Export Market Share (%)*			
	1990	*1995*	*2000*	*2004*	*1990–94*	*1995–99*	*2000–04*	*1990*	*1995*	*2000*	*2004*
Spain	635	1165	2057	4944	30	34	73	1.81	1.63	1.92	2.02
Sweden	1312	2546	3913	7203	41	29	47	3.73	3.57	3.65	2.94
Switzerland	4360	7590	10655	23027	24	26	54	12.40	10.63	9.93	9.40
Thailand	27	126	116		129	6	14	0.08	0.18	0.11	
USA	4177	6554	13122	23980	26	37	39	11.50	10.58	10.11	9.15
UK	4040	7554	10849	22429	25	18	53	11.88	9.18	12.23	9.79
World	35145	71418	107264	245027	35.12	24.91	60.86	100	100	100	100

Note: The growth rate has been obtained from the semi-log regression model of the form: LogY=a+bt, where growth rate = (antilog b-1)*100.

Source: Based on the UN COMTRADE Database, 2006.

Table 8
Trade Balance in Pharmaceuticals

Country	*Net Pharmaceutical Exports ($ million)*				*Export to Import Ratio*			
	1990	*1995*	*2000*	*2004*	*1990*	*1995*	*2000*	*2004*
Argentina		-348	-465	-283		0.29	0.40	0.58
Belgium			1283	-1306			1.23	0.96
Brazil	-289	-811	-1538	-1804	0.21	0.17	0.15	0.18
China		1175	836	1335		3.88	1.88	1.70
Hong Kong		-203	-210	-268		0.83	0.78	0.71
Czech Rep.		-444	-551	-1365		0.29	0.27	0.26
Denmark	667	1263	1908	3428	2.35	2.41	3.12	2.60
France	1019	1238	2295	4868	1.39	1.22	1.29	1.31
Germany		3605	4132	6655		1.54	1.47	1.24
India	195	319	872	1616	1.75	1.79	3.27	3.40
Indonesia	-119	-208	-137	-155	0.13	0.17	0.36	0.46
Israel	-103	-164	-172	546	0.43	0.61	0.71	1.67
Italy	-1300	-268	379	-1741	0.54	0.93	1.06	0.87
Japan	-1972	-3073	-2044	-3574	0.31	0.37	0.57	0.50
Malaysia	-130	-238	-262	-471	0.22	0.25	0.23	0.22
Mexico	-181	-186	-529	-1121	0.33	0.68	0.62	0.56
Norway	-230	-398	-502	-738	0.37	0.35	0.32	0.38
Poland		-688	-1443	-2470		0.25	0.10	0.13
Portugal	-206	-486	-641	-1602	0.32	0.23	0.31	0.19
Rep. of Korea	-165	-401	-488	-1247	0.41	0.39	0.41	0.27
Russian Federation			-1226	-2749			0.08	0.06
Singapore	10	-61	294	211	1.05	0.91	1.41	1.23

Table 8 Continued

Country	*Net Pharmaceutical Exports ($ million)*				*Export to Import Ratio*			
	1990	*1995*	*2000*	*2004*	*1990*	*1995*	*2000*	*2004*
South Africa			-558	-900			0.16	0.12
Spain	-344	-1077	-1557	-3406	0.65	0.52	0.57	0.59
Sweden	564	1379	2572	4722	1.75	2.18	2.92	2.90
Switzerland	3166	4727	5380	11419	3.65	2.65	2.02	1.98
Thailand	-183	-343	-365		0.13	0.27	0.24	
USA	1637	949	-1733	-11391	1.64	1.17	0.88	0.68
UK	1976	3246	3450	6619	1.96	1.75	1.47	1.42

Note: The growth rate has been obtained from the semi-log regression model of the form: LogY=a+bt, where growth rate = (antilog b-1)*100.

Source: Based on the UN COMTRADE Database, 2006.

4. New Global Strategies of the Indian Pharmaceutical Enterprises

Competitive advantages of the Indian pharmaceutical industry also critically hinges upon the types of global strategies adopted by its firms. Internationalization strategy that tends to complement and upgrade the technological strength of Indian pharmaceutical companies can be very crucial for sustaining and enhancing their competitive position in the world market. For example, as large number of Indian pharmaceutical firms lack technological capabilities for product development, acquiring overseas business enterprises with new product portfolios, technology and skills can allow them to emerge as global players. Internationalization in the form of strategic collaborations with global pharmaceutical companies from developed countries for contract manufacturing, research and marketing can also be beneficial for Indian companies to expand their global operations.

In the last decade, the business strategies of Indian pharmaceutical companies with respect to the overseas market have undergone significant changes. Their business decisions are increasingly driven by global market orientation for their products, business location and sourcing of raw materials and intermediates inputs. After identifying strategic markets across the globe, they adopted a variety of global strategies for enhancing their market position like undertaking direct investment for greenfield projects and overseas acquisitions, tapping foreign securities and capital markets, entering into contract manufacturing with global players, strategic alliances, apart from the traditional method of exporting. Various segments of value-added activities of Indian pharmaceutical firms like manufacturing, distribution and marketing, R&D, are now being coordinated and formulated according to considerations of global geographical advantages and worldwide business environment. In this section we look at these global strategies that the Indian pharmaceutical companies have adopted to expand their operations globally.

4.1. Outward Greenfield Foreign Direct Investment

A growing number of Indian pharmaceutical firms are undertaking outward FDI to diversify their business overseas. The number of joint and wholly-owned ventures undertaken by Indian pharmaceutical companies has consistently increased from just 1 in 1990 to a peak of 31 in 1997 (Table 9). Between 1990 and 2000 their total numbers stood at 165 joint and wholly-owned overseas ventures involving about $243 million. The number of outward investing firms has increased from 1 in 1990 to 11 in 1995 to 14 in 2000. A total of 52 pharmaceutical firms are observed to have been engaged in overseas green-

field investment activities during 1990–2000. It is interesting to note that outward FDI activity of Indian pharmaceutical industry is not entirely confined to the large-sized firms alone. Rather a number of medium-sized firms like Parenteral Drugs, Ace Laboratories, Max India, Claries Life Sciences, Gufic Ltd., etc., are also active in such overseas investment activity. However, the top fifteen largest outward investors from Indian pharmaceutical industry are large-sized pharmaceutical companies (Table 10). Geographically, developing countries are the major host of outward investments accounting for 55.2 per cent of the total number of outward FDI projects during the period 1990–2000. Developed countries claimed about 37.6 per cent and Central and Eastern Europe countries a share of 7.3 per cent (Table 20).

Table 9

Wholly-owned and Joint-ventures by Indian Pharmaceutical Companies Abroad, 1990 to 2000

Year	*No. of Wholly-Owned and Joint-Ventures*	*Amount of Consideration (US $ million)*	*Number of Outward Investing Firms*
1990	1	NA	1
1991	3	NA	3
1992	5	0.19	5
1993	16	2	10
1994	6	NA	4
1995	11	NA	7
1996	30	33.1	19
1997	31	98.7	20
1998	23	29.7	15
1999	16	22.4	13
2000	23	104.9	14
All Above Years	165	291	62*

Note: * Total number of firms that have undertaken O-FDI at least once between 1990 and March 2001.

Source: Based on various sources: i. Indian Investment Centre (1998) *Indian Joint Ventures & Wholly owned Subsidiaries Abroad Approved during the year 1996*, New Delhi; ii. Indian Investment Centre (1998) *Indian Joint Ventures & Wholly owned Subsidiaries Abroad Approved up-to December 1995*, New Delhi; iii. Unpublished firm level outward investment data collected from the Ministry of Finance through Research and Information System (2002), New Delhi.

Table 10
List of Outward Investing Pharmaceutical Firms during 1991–2000

Size Classification	*Company*	*Number of Approvals*	*Value ($ million)*	*Per cent*
Large	Wockhardt Ltd.	6	85.095	29.3
Large	Sun Pharmaceuticals	10	44.832	15.4
Large	Ranbaxy Laboratories Ltd.	13	43.476	14.9
Large	Core Healthcare Limited	8	21.738	7.5
Large	Dabur Ltd.	8	20.334	7.0
Large	Strides Arcolab Ltd.	5	14.030	4.8
Large	Cheminor Drugs Ltd.	4	7.381	2.5
Large	Lupin Laboratories	5	6.990	2.4
Large	Ajanta Pharma	17	6.858	2.4
Large	Dr.Reddy's Labs Ltd.	7	5.000	1.7
Large	Kopran Ltd.	4	3.932	1.4
Large	Colgate Palmolive	1	3.556	1.2
Large	Aurobindo Pharma	6	2.768	1.0
Large	Shasun Chemicals	3	2.015	0.7
Large	Cadila Pharmaceuticals	2	2.002	0.7
Large	Nicholas Piramal India	2	1.814	0.6
	Shanta Biotechnics	1	1.750	0.6
	Serene Industries Ltd.	1	1.663	0.6
Large	Cadila Healthcare	3	1.538	0.5
Large	Natco Pharma	2	1.500	0.5
Medium	Parenteral Drugs	2	1.155	0.4
Medium	Ace Laboratories	4	1.115	0.4
	Rallis India Ltd.	1	1.108	0.4
	Nukem Remedies Ltd.	2	1.051	0.4
	Core Worldwide Ltd	5	1.043	0.4
Large	J B Chemicals	1	1.000	0.3
	Adhyatama Invetments	3	0.797	0.3
	Mayo India Ltd.	1	0.561	0.2
	Lupin Agro Chemicals	1	0.555	0.2
	Recon Ltd.	1	0.510	0.2
Large	FDC Ltd.	1	0.500	0.2
Medium	Max India	1	0.500	0.2
	Akshata Holdings	1	0.436	0.1
Large	Dishman Pharmaceuticals	2	0.414	0.1
Medium	Claries Life Sciences	1	0.400	0.1
Large	Glenmark Pharmaceutical Ltd.	2	0.281	0.1
Medium	Gufic Ltd.	1	0.250	0.1
Medium	Concept Pharmaceutical Ltd.	1	0.169	0.1

Table 10 Continued

Size Classification	*Company*	*Number of Approvals*	*Value ($ million)*	*Per cent*
Large	Torrent Pharmaceuticals	1	0.160	0.1
	Shahnaz Hussain Herbal Ltd.	1	0.128	0.0
	AR Chhadda & Co.	1	0.100	0.0
	Pharmaceutical Products of India Ltd.	1	0.100	0.0
	Ajas Components P Ltd.	1	0.075	0.0
Large	USV Ltd.	1	0.061	0.0
	Atmasantulana Ayurveda Ltd.	1	0.028	0.0
Medium	Medicrop Technologies India Ltd.	1	0.026	0.0
	Alken Laboratories	1	0.025	0.0
	Universal Capsuls Ltd.	1	0.025	0.0
	Malladi Drugs and Pharmaceuticals Ltd.	2	0.020	0.0
Large	Orchid Chemicals & Pramaceuticals	1	0.010	0.0
	Trishul Overseas Ltd.	1	0.010	0.0
	Cadila Exports Ltd.	1	NA	
Large	Cipla Ltd.	1	NA	
Medium	Elegant Pharmaceuticals Ltd.	1	NA	
Small	Gujarat Injects Ltd.	1	NA	
	Madhur Pharma & Research Labs	1	NA	
	Mideast (India) Ltd.	1	NA	
	Shalaks Pharmaceuticals Ltd.	1	NA	
	Torrent Exports Ltd.	1	NA	
	V.B. Ltd	1	NA	
	Velvette International Pharma Products L	2	NA	
	Wockhardt International Ltd.	1	NA	
Grand Total		**165**	**290.89**	**100**

Note: The size classification of firms is based on the distribution of firm sales obtained from the PROWESS database: firms with sales up to 25th per centile are taken as small-sized; those having sales greater than 25th per centile and up to 75th per centile are classified as medium-sized; and those possessing sales greater than 75th per centile are designated as large-sized enterprises.

Source: Based on various sources: i. Indian Investment Centre (1998) *Indian Joint Ventures & Wholly owned Subsidiaries Abroad Approved during the year 1996*, New Delhi; ii. Indian Investment Centre (1998) *Indian Joint Ventures & Wholly owned Subsidiaries Abroad Approved upto December 1995*, New Delhi; iii. Unpublished firm level outward investment data collected from the Ministry of Finance through Research and Information System (2002), New Delhi.

Wockhardt Limited turns out to be one of the aggressive outward investors among the Indian pharmaceutical firms. It has identified generics and bio-generics as important future growth strategies and has adopted outward investment in greenfield and brownfield forms to achieve them. The company, at the end of 2004, made its presence felt in the leading and emerging markets of the world via its eight subsidiaries (Table 11). In 2004, more than 50 per cent of the consolidated sales of the company came from overseas markets, namely the USA and Western European markets. The consolidated sales from these markets have increased by more than 55 per cent to Rs. 6239 million in the year 2004 from Rs. 1426 million in the year 2003[8]. The European operation of the company is undertaken by Wockhardt UK Ltd. in the UK and esparma GmbH in Germany—both are wholly-owned subsidiaries. Wockhardt UK Ltd is the integrated and synergized entity of the two UK-based companies, Wallis Laboratory and CP Pharmaceuticals, which were acquired by Wockhardt in 1998 and 2003 respectively. It is amongst the 10 largest generics companies in the UK and has US FDA-approved manufacturing facilities for injectables such as cartridges, vials and ampoules (including lyophilized products). Wockhardt has adopted the same inorganic route to enter into Germany, the second largest generics market in Europe after the UK. It had acquired esparma GmbH in the year 2004 and gained a strategic and strong presence in the high-potential therapeutic segments of urology, diabetology and neurology. The establishment of Wockardt USA Inc. is helping the company to strengthen its marketing networks in the US, apart from support for ANDA filings with a full fledged regulatory team.

Table 11
List of Subsidiaries of Wockhardt Limited

Subsidiary	*Country of Incorporation*	*Ownership (%)*
Wockhardt UK Limited	UK	100%
esparma GmbH	Germany	100%
Wockhardt Europe Ltd.	British Virgin Island	100%
Wockhardt Biopharma Ltd.	India	100%
Wockhardt Switzerland Holding AG	Switzerland	100%
Wockhardt Farmaceutica Do Brazil Ltda.	Brazil	100%
Wockardt USA Inc.	USA	100%

Source: Wockardt Annual Report 2004.

Ranbaxy Laboratories, one of the world's top 10 generic pharmaceutical companies, has also pursued outward investment as a strategy to become a global player. It has about forty-six subsidiaries and one joint venture covering important regions across the world (Table 12). The international operations now account for about 80 per cent of the total

[8] Wockhardt Annual Report 2004, Director's Report, pp. 28.

sales of the company[9]. Since its entry into North America in 1995, over the years the US has emerged as the largest market of the company. The US operation has generated about US$ 426 million, nearly 36 per cent of the global sales of the company in 2004 (Table 13). The US presence of the company consists of six subsidiaries, namely Ranbaxy Inc., Ohm Laboratories Inc., Ranbaxy USA Inc., Ranbaxy Laboratories Inc., Ranbaxy Pharmaceuticals Inc. and Ranbaxy Signature L.L.C. Europe with US $192 million sales is the second largest market for the company, contributing nearly 16 per cent of the overall revenues. A total of thirteen subsidiaries of the company today operate in this market. The business model of the company is based on twin objectives of innovation for drug delivery and discovery and of expanding geographical presence in world generics business. With its world-class manufacturing facilities in India and oversees, approved by international agencies like MCA-UK, MCC-South Africa, FDA-USA and TGA-Australia, Ranbaxy has emerged as a major producer and supplier of quality generics and Active Pharmaceutical Ingredients.

Table 12
List of Subsidiaries and Joint Ventures of Ranbaxy Laboratories

Subsidiary/JV	*Name of the Subsidiary/JV*	*Country of Incorporation*	*Ownership (%)*
Subsidiary	Ranbaxy (UK) Limited	UK	100%
Subsidiary	Ranbaxy Farmaceutica Ltda.	Brazil	70%
Subsidiary	Ranbaxy Inc. ("RPI")	USA	100%
Subsidiary	Ranbaxy (Hong Kong) Limited	Hong Kong	100%
Subsidiary	Ranbaxy Poland S.P. Zoo.	Poland	100%
Subsidiary	Ohm Laboratories, Inc.	USA	100%
Subsidiary	Rexcel Pharmaceuticals Limited	India	100%
Subsidiary	Ranbaxy Do Brasil Ltda.	Brazil	100%
Subsidiary	ZAO Ranbaxy	Russia	100%
Subsidiary	Unichem Pharmaceuticals Limited	Thailand	99%
Subsidiary	Ranbaxy Drugs and Chemicals Company	India	100%
Subsidiary	Ranbaxy Pharmacie Generiques SAS,	France	100%
Subsidiary	Solus Pharmaceuticals Limited	India	100%
Subsidiary	Bounty Holdings Company Limited	Thailand	99%
Subsidiary	Vidyut Travel Services Limited	India	100.00%
Subsidiary	Ranbaxy (Netherlands) B.V. ("RNBV")	Netherlands	100.00%
Subsidiary	Office Pharmaceutique Industriel et Hospitalier SARL	France	100.00%
Subsidiary	Gufic Pharma Limited	India	98.00%
Subsidiary	Ranbaxy Malaysia Sdn. Bhd.	Malaysia	56.00%
Subsidiary	Ranbaxy PRP (Peru) S.A.C.	Peru	100.00%

[9] Ranbaxy Annual Report 2004, pp. 12-13.

Table 12 Continued

Subsidiary/JV	*Name of the Subsidiary/JV*	*Country of Incorporation*	*Ownership (%)*
Subsidiary	Ranbaxy (S.A.) (Proprietary) Limited	South Africa	100%
Subsidiary	Ranbaxy USA, Inc.	USA	100.00%
Subsidiary	Ranbaxy N.A.N.V	Netherlands	100.00%
Subsidiary	Ranbaxy Panama, S.A.	Panama	100.00%
Subsidiary	Ranbaxy Europe Limited	UK	100.00%
Subsidiary	Ranbaxy(Guangzhou China) Limited	China	83.00%
Subsidiary	Ranbaxy Unichem Company Limited	Thailand	89.00%
Subsidiary	Ranbaxy France SAS	France	100%
Subsidiary	Unichem Distributors Ltd.	Thailand	100%
Subsidiary	Laboratorios Ranbaxy, S.L.	Spain	100%
Subsidiary	Ranbaxy Laboratories Inc.	USA	100%
Subsidiary	Ranbaxy Pharmaceuticals Canada Inc.	Canada	100%
Subsidiary	Ranbaxy Drugs Limited	India	100%
Subsidiary	Vidyut Investments Limited	India	100%
Subsidiary	Ranbaxy Portugal –Com E Desenvolv De Prod Farmaceuticos Unipessoal Lda	Portugal	100%
Subsidiary	Ranbaxy Nigeria Limited	Nigeria	85%
Subsidiary	Basics GmbH	Germany	100%
Subsidiary	Ranbaxy Pharmaceuticals, Inc.	USA	100%
Subsidiary	Ranbaxy Pharmaceuticals BV	Netherlands	100%
Subsidiary	Ranbaxy Fine Chemicals Limited	India	100%
Subsidiary	Ranbaxy Egypt (L.L.C.)	Egypt	100%
Subsidiary	Ranbaxy Ireland Limited	Ireland	100%
Subsidiary	Ranbaxy Signature, L.L.C.	USA	68%
Subsidiary	Ranbaxy Australasia Pty. Ltd.	Australia	100%
Subsidiary	Ranbaxy Holdings (UK) Limited	UK	100%
Subsidiary	Ranbaxy Vietnam Company Limited	Vietnam	100%
Joint Venture	Thembalami Pharmaceuticals (Pty.) Ltd.	South Africa	50%

Source: Ranbaxy Annual Report 2004.

Table 13
Ranbaxy's Global Sales by Selected Regions and Countries, 2004

Region/Country	*In US $ million*	
	Sales	*Per cent*
USA	426	36.3
Europe	192	16.4
UK	50	4.3
Germany	26	2.2
France	73	6.2
Brazil	31	2.6
Russia (Including Ukraine)	45	3.8
India	217	18.5
China	12	1.0
Total	**1174**	**100**

Note: The sum of countries' sales will not add up to the total sales as there is an omitted residual category.
Source: Ranbaxy Annual Report 2004, pp. 19.

Sun Pharmaceuticals is one of the top 5 pharmaceutical companies in India with strong manufacturing focus on speciality bulk actives of over 90 bulk drugs including ornidazole, iopamidol and iohexol and formulations. Its manufacturing facilities at four plants have US and European approvals for compliance with international good manufacturing practices, safety and quality. Like many other Indian pharmaceutical firms, overseas investment has been a key strategy for Sun Pharmaceutical's drive for internationalization. Apart from exporting, the company has gone for overseas acquisition, greenfield investment and joint ventures to serve the international market. It has eight subsidiaries catering to the different regions of the international market (Table 14). Caraco Pharmaceutical Laboratories provided a presence of the company in high value generic markets in the US. Subsidiaries in Brazil and Mexico have recently been started to strengthen the company's presence in the Latin American markets, besides commissioning a manufacturing facility in Bangladesh. Since 1996, the company has used overseas acquisitions to gain access to markets and manufacturing capabilities. It had acquired about about 30 per cent equity in Detroit-based Caraco Pharm Labs in 1997 and Hungary-based Valeant Pharma's manufacturing operation in 2005, apart from several brand acquisitions. International sales account for about 28 per cent of the company's total sales in 2005 (Table 15). Between 2004 and 2005, the international sales of the company have grown twice the growth rate of the domestic sales, suggesting increasing internationalization of the company. In this process of internationalization, overseas subsidiaries have played an important role. For example, the US sales of the company are increasingly driven by its subsidiary, Caraco Pharmaceutical Laboratories: "Increasing

US sales at our subsidiary, Caraco, building on the advantage of backward integration, have helped it compete more aggressively in the competitive US generic market." (Sun Pharmaceutical Annual Report, 2004–2005, pp. 2)

Table 14
List of Subsidiaries of Sun Pharmaceutical Industries Ltd.

Name of the Subsidiary	*Country of Incorporation*	*Ownership (%)*
Caraco Pharmaceutical Laboratories Ltd.	USA	31.80%
Sun Pharma Global Inc. BVI	British Virgin Islands	100%
Sun Pharmaceutical (Bangladesh) Ltd.	Bangladesh	72.41%
Sun Pharma De Mexico S. A. DE C.V.	Mexico	75%
Sun Pharmaceutical Industries Inc.	USA	100%
ZAO Sun Pharma Industries Limited	Russia	100%
Milmet Pharma Limited	India	100%
Sun Farmaceutica Ltda.	Brazil	99.57%

Source: Sun Pharmaceutical Annual Report, 2004–2005.

Table15
Consolidated sales of Sun Pharma and Subsidiaries, Rs million

Sales Category	*March 2004*	*March 2005*	*Percentage change*
Domestic Sales	6738	7716	14.5
Domestic Formulations	5778	6800	17.7
Domestic Bulk	960	908	-5.4
Domestic Others		8	
International sales	3863	5037	30.4
Export Formulations	2900	3690	27.2
Export Bulk	961	1345	40.0
Export Others	2	2	0
Total sales	14464	17790	23.00

Source: Sun Pharmaceutical Annual Report, 2004–2005, pp. 2.

Gujarat-based Core Healthcare Limited (CHL), leading manufacturers of intravenous (IV) fluids, has planned an aggressive entry into international markets. It is supplying products to more than 70 countries[10], exporting more than 35 per cent of the total production. In 2002, the production of intravenous (IV) fluid reached the one billion mark and the company had attributed this achievement to its international operations, distribution network and quality of products[11]. It is the first Indian pharmaceutical company to receive the ISO certification. The company has about 600 outlets across the country and has a 40 per cent market share in IV business. Maintaining highest levels of

[10] Business Line (2002), 'Core Healthcare IV fluid bottle output at 1 billion', Friday, Aug 16.
[11] Business Line (2002), 'Core Healthcare IV fluid bottle output at 1 billion', Friday, Aug 16.

quality and resorting to joint ventures with overseas strategic partners has been crucial for higher export performance. In 1997, the company has set up a joint venture with Uzpharmprom in Uzbekistan for manufacturing IV fluids and tablets. In 1999, the company established two manufacturing plants for IV fluids, tablets and penicillin capsules in Myanmar and Malaysia. The Myanmar plant is build for Government of Myanmar at the cost of $5 million, located near Yangon. It provides the most modern healthcare facilities like high quality I.V. fluids and other pharmaceutical products in Myanmar. However, despite maintaining growth and emphasizing on internationalization, the company could not improve its economic performance. The financial strength of the company was severely hurt due to delayed and high-cost of financing since 1996 and internal resources were not enough for meeting the high growth plan adopted by the company and also partly due to management concerns. As a result, the company emerged as one of the biggest bank defaulters companies and has been referred to the Board of Industrial and Financial Reconstruction (BIFR) in March 2000 to be declared as a sick unit. In December 2004, the company with its assets and liabilities was acquired by another company named Nirma Ltd[12].

Ajanta Pharmaceutical is another Indian company that has adopted outward investment as a strategy to improve its position in international markets. It has some eight trans-border subsidiaries and joint ventures (Table 16). Geographically, majority of these outward ventures are directed at the CIS (Commonwealth of Independent States) markets such as Kazakhstan, Tajikistan, Uzbekistan and Kyrgyz Republic. Subsidiaries in two countries such as Mauritius and Turkmenistan have world-class manufacturing facilities with state-of-the-art infrastructure to manufacture various dosage forms like tablets, capsules, injections, ointments and powders. These are two subsidiaries that are performing well with profits and are expected to improve their performance substantially. However, other overseas ventures such as Ajanta Pharma (Tashkent), Tajik Ajanta Pharma, Kazakh Ajanta Pharma, Surkhan Ajanta Pharma and Kyrgyz Ajanta Pharma have turned out to be non-performing ventures and the company is in the process of exiting from all of them. The company realized that outward FDI meant for producing in the foreign markets may not always be a profitable option of market serving. Rather outward FDI in the form of opening own marketing offices and trade supporting networks that ensure prompt delivery and follow-up programs is helpful for exporting from the home country. The company with a view to expand overseas business operations has established an extensive marketing network in foreign markets. This has helped the company to access the international markets extensively and presently it exports to over 50 countries around the world with exports accounting a substantial part

[12] Financial Express (2004), 'Nirma acquires Core Healthcare', Friday, December 17.

of the total revenues. In 2004–05 exports constituted about 80 per cent of the sales as compared to 72 per cent in 2003–04[13].

Table 16
Subsidiaries and Joint Ventures of Ajanta Pharmaceutical

Subsidiary/JV	*Name of the Subsidiary/JV*	*Country of Incorporation*	*Ownership (%)*
Subsidiary	Kazakh Ajanta Pharma Ltd.	Kazakhstan	88%
Subsidiary	Ajanta Pharma (USA) Inc.	USA	83%
Subsidiary	Ajanta Pharma (Tashkent) Ltd.	Uzbekistan	100%
Joint Venture	Surkhan Ajanta Pharma Ltd.	Uzbekistan	51%
Joint Venture	Ajanta Pharma (Mauritius) Ltd.	Mauritius	58%
Joint Venture	Kyrgyz Ajanta Pharma Ltd.	Kyrghstan	52%
Joint Venture	Turkmendarman Ajanta Pharma Ltd.	Turkmenistan	50%
Joint Venture	Tajik Ajanta Pharma Ltd.	Tajikistan	35%

Source: Ajanta Pharma Annual Report 2003–04.

Strides Arcolab Limited provides an example of a very young pharmaceutical company successfully expanding business in international market. Since its beginning in 1990 as a small pharmaceutical company engaged in formulations, Strides Arcolab has grown to be a Rs. 500 crore company and among top 15 pharmaceutical companies in India. Its manufacturing activities now cover a spectrum of ethical pharmaceutical products, OTC products and nutraceuticals. It is one of the top five softgel capsule manufacturers in the world with twelve internationally approved manufacturing plants in USA, Mexico, Brazil and India. The company has established strong marketing capabilities overseas with marketing presence in 49 countries. As a result of the trade-supporting type of FDI that the company has undertaken in the past, a substantial part of its revenue is contributed by exports. During 2004–05, exports accounted for about 92 per cent of sales of the company[14]. Apart from undertaking exports and marketing activities, the company has strongly gone for direct production overseas. It has about twelve overseas subsidiaries across the world (Table 18) and about 95 per cent of its global revenues is contributed by foreign markets (Table 19). This indicates that Strides is largely a multinational firm with business strategies and planning is more focused on global markets.

[13] Ajanta Pharma Annual Report 2004-05, pp. 6.

[14] The annualized sales of the company is Rs. 244.74 and exports is Rs. 225.76 as on March 2005. Source: Prowess Database (2006).

Table 17
Geography of Strides Arcolab' Revenues, 2002–03 to 2003–04

Country/Region	*Percentage Share*	
	2002–03	*2003–04*
Developing Region	75	66
India	9	5
South East Asia	4	4
South Central America	36	32
Africa	26	24
Latin America	0	1
Developed Region	6	20
Australia	0	4
Europe	6	5
Japan	0	5
North America	0	6
Russia & CIS	9	9
Multi Aid Agencies	10	5
Total	**100**	**100**

Source: Based on Strides Arcolab Annual Report 2003–04, pp 1.8.

Table 18
Subsidiaries and Joint Ventures of Strides Arcolab

Subsidiary/JV	*Name of the Subsidiary/JV*	*Country of Incorporation*	*Ownership (%)*
Subsidiary	Arcolab Ltd. SA	Switzerland	100%
Subsidiary	Quantum Life Sciences Pvt. Ltd.	India	100%
Subsidiary	Strides Inc.	USA	100%
Subsidiary	Pharma Strides	Canada	85%
Subsidiary	Cellofarm Ltda	Brazil	
Subsidiary	Strides SA Pharmaceutical Pty Ltd	South Africa	51%
Joint Venture	Akorn - Strides LLC	USA	50%
Subsidiary	Strides UK Ltd.	UK	95%
Subsidiary	Global Remedies Ltd.	India	100%
Subsidiary	Strides Africa Ltd.	British Virgin Islands	100%
Subsidiary	Strides Research & Specialty Chemicals Ltd.	India	100%
Subsidiary	Strides Arcolab (FA) Ltd	UAE	100%
Subsidiary	Solara S.A de C.V	Mexico	65%
Subsidiary	Infabra Industria Farmaceutica Ltda.	Brazil	51%

Source: Strides Arcolab Annual Report 2003–04

There are several other Indian pharmaceutical firms such as Dabur, Dr. Reddy, Natco Pharma, and others who have pursued the strategy of greenfield outward investment to expand business globally. As growing number of firms are undertaking this route of globalization, this indicates that Indian pharmaceutical companies are more global now than ever before.

4.2. Brownfield Overseas Investment

Last ten years or so have seen Indian pharmaceutical firms progressively adopting brownfield investment as an alternative strategy for trans-border growth through acquisitions of business enterprises abroad. The number of investments for overseas acquisitions increased significantly from just 1 in 1995 to 21 in 2005 (Table 19). Between 1997 and 2005, the amount of consideration involved in overseas acquisitions has increased by 71 times from just $7.5 million to reach $532.9 million. At the end of March 2006, Indian pharmaceutical companies have undertaken $1663 million worth of investments in acquiring overseas pharmaceutical companies, brands and R&D laboratories. Most of these acquisitions, nearly 76 per cent of the overseas acquisition cases, are directed at developed markets like Europe and North America. Developing countries accounted for just about 18 per cent and Central and Eastern Europe about 5.6 per cent (Table 20). This shows that overseas acquisition activities of Indian pharmaceutical companies are largely developed market oriented and apart from being a market entry strategy, such activities are motivated to acquire foreign research capabilities, skills and intellectual properties.

Table 19
Overseas Acquisitions by Indian Pharmaceutical Companies, 1995 to March 2006

Year	*No. of Overseas Acquisitions*	*Amount of Consideration (US $ million)*
1995	1	
1997	1	7.5
1998	1	9
2000	1	8
2001	1	
2002	6	22.9
2003	5	113.9
2004	7	63.0
2005	21	532.9
2006 (Up to March)	10	906

Note: In calculating amount of consideration only those acquisition deals are included for whom information on consideration is available.

Source: Based on Table 21.

Table 20
Regional Distribution of Greenfield and Brownfield Overseas Investment by Indian Pharmaceutical Companies

Region/Country	*Greenfield Approvals in Number (1990–2000)*		*Overseas Acquisitions in Number (1995 to March 2006)*	
	Total Number	*Per cent*	*Total Number*	*Per cent*
Developed Countries	62	37.6	41	75.9
European Union	31	18.8	23	42.6
Austria				
Belgium			3	5.6
France	1	0.6	2	3.7
Germany	1	0.6	5	9.3
Ireland	5	3.0	1	1.9
Italy			2	3.7
Luxemburg	2	1.2		
Netherlands	6	3.6		
Portugal	1	0.6		
Spain	1	0.6	1	1.9
Sweden			1	1.9
UK	14	8.5	8	14.8
Other Western Europe	2	1.2	1	1.9
Switzerland	2	1.2	1	1.9
North America	28	17.0	15	27.8
Canada	2	1.2	1	1.9
USA	26	15.8	14	25.9
Other Developed Countries	1	0.6	2	3.7
Australia	1	0.6	1	1.9
Japan			1	1.9
Developing Countries	91	55.2	10	18.5
Africa	18	10.9	1	1.9
Botswana	1	0.6		
Ivory Coast	1	0.6		
Kenya	2	1.2		
Mauritius	10	6.1		
Nigeria	1	0.6		
South Africa	1	0.6	1	1.9
Tanzania				
Uganda	1	0.6		
Zimbabwe	1	0.6		
Latin America and the Caribbean	6	3.6	6	11.1
Argentina			1	1.9
Brazil	5	3.0	3	5.6

Table 20 Continued

Region/Country	*Greenfield Approvals in Number (1990–2000)*		*Overseas Acquisitions in Number (1995 to March 2006)*	
	Total Number	*Per cent*	*Total Number*	*Per cent*
Mexico	1	0.6	1	1.9
Venezeula			1	1.9
Asia and the Pacific	67	40.6	3	5.6
Azerbaijan	2	1.2		
Bangladesh	3	1.8		
China	6	3.6	3	5.6
Cyprus	1	0.6		
Hong Kong	5	3.0		
Indonesia	1	0.6		
Jordan	1	0.6		
Kazakhstan	2	1.2		
Krghystan	2	1.2		
Malaysia	3	1.8		
Nepal	13	7.9		
Singapore				
Sri Lanka	3	1.8		
Tajikistan	3	1.8		
Thailand	6	3.6		
Turkmenistan	3	1.8		
U.A.E.	3	1.8		
Uzbekistan	10	6.1		
Central and Eastern Europe	12	7.3	3	5.6
Hungary	2	1.2	1	1.9
Poland			1	1.9
Romania			1	1.9
Russia	6	3.6		
Ukraine	4	2.4		
Grand Total	**165**	**100.0**	**54**	**100.0**

Source: Data on greenfield approvals is based on various sources: i. Indian Investment Centre (1998) *Indian Joint Ventures & Wholly owned Subsidiaries Abroad Approved during the year 1996*, New Delhi; ii. Indian Investment Centre (1998) *Indian Joint Ventures & Wholly owned Subsidiaries Abroad Approved upto December 1995*, New Delhi; iii. Unpublished firm level outward investment data collected from the Ministry of Finance through Research and Information System (2002), New Delhi. Data on brownfield is based on Table 21.

Table 21

Overseas Acquisitions by Indian Pharmaceutical Companies, 1995 to March 2006

Month	*Year*	*Acquirer Company*	*Acquired Company / Asset/Brands*	*Headquarter*	*Amount ($ million)*
September	1995	Ranbaxy Laboratories	Ohm Labs	USA	NA
	1997	Sun Pharmaceutical	30 per cent stake in Caraco Pharm Labs	USA	8
March	1998	Wockhardt Ltd.	Wallis Laboratory	UK	9
April	2000	Ranbaxy Laboratories	Basics, Germany-based generic company of Bayer AG	Germany	8
December	2001	Aurobindo Pharma Limited	60 per cent stake in Shanghai Wide Tex Chemical Co Limited	China	NA
March	2002	Dr Reddy's Laboratories Ltd	BMS Laboratories Ltd. and Meridian Healthcare (UK) Ltd.	UK	13
April	2002	Unichem	Niche Generics	UK	5
June	2002	Ranbaxy Laboratories	A brand called Veratide from Procter & Gamble Pharmaceuticals	Germany	5
July	2002	Ranbaxy Laboratories	Liquid manufacturing facility from the New York-based Signature Pharmaceuticals Inc.	USA	NA
September	2002	Ranbaxy Laboratories	10 per cent equity stake in Nihon Pharmaceutical Industry Co Ltd.	Japan	NA
October	2002	Sun Pharmaceutical	Additional stake of 4 per cent in Caraco Pharmaceutical	USA	NA
April	2003	Aurobindo Pharma Limited	The entire 50 per cent stake of Shanxi Tongling Pharmaceuticals Company Ltd (STPCL) in a Chinese joint venture	China	4
May	2003	Suven Pharmaceuticals Ltd.	The assets of the New Jersey-based Synthon Chiragenics Corporation	USA	NA
July	2003	Wockhardt Ltd.	CP Pharmaceuticals Ltd.	UK	18
July	2003	Zydus Cadila	The formulation business of Alpharma France	France	6
December	2003	Ranbaxy Laboratories	RPG (Aventis) SA and its subsidiary OPIH SARL	France	86

Table 21 Continued

Month	*Year*	*Acquirer Company*	*Acquired Company / Asset/Brands*	*Headquarter*	*Amount ($ million)*
April	2004	Glenmark Pharmaceuticals	Laboratorios Klinger	Brazil	5
May	2004	Dr Reddy's Laboratories Ltd.	Trigenesis Therapeutics Inc.	USA	11
May	2004	Wockhardt Ltd.	Esparma Gmbh	Germany	11
June	2004	Jubilant Organosys Ltd.	80 per cent stake in two Belgium-based pharmaceutical companies - Pharmaceutical Services Incorporated NV and PSI Supply NV	Belgium	16
August	2004	Glenmark Pharmaceuticals	Two FDA approved products from Clonmel Healthcare Ltd.	Ireland	NA
September	2004	Sun Pharmaceutical	Three brands from US-based Women's First Healthcare	USA	5
December	2004	Nicholas Piramal India	The global inhalation anaesthetics (IA) business of Rhodia Organique Fine Ltd	UK	14
February	2005	Strides Arcolab	Additional stake of 12.5% in Strides Latina	Brazil	6
March	2005	Glenmark Pharmaceuticals	The hormonal brand, Uno-Ciclo, from Instituto Biochimico Indústria Farmacêutica Ltda	Brazil	5
April	2005	Dishman Pharmaceuticals	Synprotec Ltd.	UK	4
May	2005	Malladi Drugs and Pharmaceuticals	Novus Fine Chemicals	USA	23
June	2005	Matrix Laboratories	Docpharma NV	Belgium	263
June	2005	Ranbaxy Laboratories	Efarmes Sa	Spain	18
June	2005	Torrent Pharmaceuticals	Heumann Pharma GmbH & Co Generica KG	Germany	30
June	2005	Stides Arcolab	60% stake in Biopharma	Venezeula	1
July	2005	Jubilant Organosys Ltd	Trinity Labs	US	12

Table 21 Continued

Month	*Year*	*Acquirer Company*	*Acquired Company / Asset/Brands*	*Headquarter*	*Amount ($ million)*
July	2005	Jubilant Organosys Ltd	64 per cent equity in Trinity Laboratories Inc and its subsidiary Trigen Laboratories Inc	USA	12
July	2005	Nicholas Piramal India	17 % stake in BioSyntech, Inc.	Canada	7
July	2005	Strides Arcolab	A sterile manufacturing facility	Poland	8
July	2005	Strides Arcolab	70% stake in Beltapharm	Italy	2
August	2005	Sun Pharmaceutical	Valeant Pharma's manufacturing operations	Hungary	10
September	2005	Matrix Laboratories	60 per cent stake in the Mchem group	China	NA
October	2005	Glenmark Pharmaceuticals	Servycal SA	Argentina	NA
October	2005	Jubilant Organosys Ltd	Target Research Associates Inc	USA	34
October	2005	Nicholas Piramal India	Avecia Pharmaceuticals	UK	17
November	2005	Dr Reddy's Laboratories	Roche's API unit	Mexico	59
November	2005	Sun Pharmaceutical	Able Labs	US	23
December	2005	Glenmark Pharmaceuticals	Bouwer Bartlett	South Africa	NA
February	2006	Aurobindo Pharma Limited	Milpharm Ltd	UK	NA
February	2006	Dr Reddy's Laboratories	Betapharm Arzneimittel GmbH	Germany	582
February	2006	Kemwell Pvt Ltd.	Fizer's manufacturing plant in Sweden	Sweden	NA
February	2006	Natco Pharma	NICK's Drug Store	USA	NA
February	2006	Dishman Pharmaceuticals	51% in IO3S Ltd	Switzerland	NA
March	2006	Marksans Pharma Ltd.	Majority stake in Nova Pharmaceuticals	Australia	NA
March	2006	Ranbaxy Laboratories	Patents, trademarks and equipment of Senetek's autoinjector business	USA	NA
March	2006	Ranbaxy Laboratories	The unbranded generic business of Allen SpA, a division of GlaxoSmithKline	Italy	NA

Table 21 Continued

Month	*Year*	*Acquirer Company*	*Acquired Company / Asset/Brands*	*Headquarter*	*Amount ($ million)*
March	2006	Ranbaxy Laboratories	Terapia	Romania	324
March	2006	Ranbaxy Laboratories	Ethimed NV	Belgium	NA

Note: Consideration involved in several acquisitions is given in local currencies including Euros. These are converted into dollar term using the monthly average exchange rate of dollars. NA-Not Available.

Source: Based on various Indian financial newspapers

Ranbaxy Laboratories emerged as the largest overseas acquirer with 11 acquisitions during 1995–2006 (Table 21). In September 1995, the company acquired Ohm Laboratories based in New Brunswick, New Jersey[15]. This is an important strategy since the company entered the US market in 1994. This acquisition provided Ranbaxy's access to advanced manufacturing capabilities and processes to manufacture quality OTC (over-the-counter) drugs, branded and generic products and helped in developing its presence in the US OTC market. In April 2000, the company acquired Basics GmbH, the generics business of Bayer in Germany for a consideration of $4 million. Apart from Ranbaxy's entry into the third largest generics market of the globe, the deal has expanded its product portfolio by another twenty products hitherto marketed under Basics[16]. The year 2002 saw three overseas acquisitions by Ranbaxy. It has acquired Veratide, an anti-hypertensive brand from Procter & Gamble Pharmaceuticals in Germany[17]. This brand acquisition is to further strengthen Ranbaxy's presence in the German market by augmenting Basics' cardiovascular product portfolio. The second acquisition in the year 2002 is liquid manufacturing facility from the New York-based Signature Pharmaceuticals Inc. This manufacturing facility with its latest testing, research and quality assurance capabilities is a strategic fit for Ranbaxy's business in the US for the production of certain liquid-based dosage forms[18]. The third acquisition in the year 2002 is that of acquiring 10 per cent equity stake in a generic company named Nihon Pharmaceutical Ltd in Japan[19]. As a part of this acquisition, Ranbaxy and Nippon Chemiphar Limited (NC), the parent company of Nihon Pharmaceutical, entered into a strategic alliance to launch Ranbaxy's ethical and drug delivery system based products, besides generics in the Japanese market. In December 2003, Ranbaxy acquired France's

[15] Hindu Business Line (2002) 'Ranbaxy: A dose of US', Friday, January 11.

[16] Business World (2004), 'PHARMA M&AS: What's the big deal?', June 28.

[17] Hindu Business Line (2002), 'Ranbaxy buys Veratide from P&G in Germany', Friday, June 28.

[18] Hindu Business Line (2002), 'Ranbaxy arm buys production unit from US company', Jul 24.

[19] Hindu Business Line (2002), 'Ranbaxy to pick up 10% stake in Japanese co', Friday, Sep 27.

fifth largest generic player, RPG Aventis and its subsidiary, OPIH SARL, for $86 million[20]. This acquisition, a move by the company to expand its European position through France, has placed it amongst the top generic companies in the French market. It also added to Ranbaxy's product portfolio by another 52 molecules of which 18 are among the 20 best selling molecules in the French market. With the dual purpose of securing presence and augmenting existing product portfolio in Spain, Ranbaxy has acquired a generic product portfolio covering eighteen products from the Spanish pharmaceutical company Efarmes, SA[21]. This acquisition has helped the company to significantly improve its ability to provide a wide range of quality generics belonging to the cardio vascular system (CVS), central nervous system (CNS) and pain management segments. In March 2006, Ranbaxy announced four overseas acquisitions, namely patents for autoinjector device of Senetek, unbranded generic business of Allen SpA, Terapia and Ethimed NV. The first overseas acquisition is a strategy of acquiring firm-specific intangible assets for autoinjector business. Ranbaxy acquired patents, trademarks and equipment used for the self-administration of medicines from the US company Senetek[22]. The second one concerns with the company's entry strategy into the Italian generic market. The acquisition of unbranded generic business of Allen SpA, a division of GlaxoSmithKline, ensures Ranbaxy's access to the Italian market, one of the fastest growing markets in Europe[23]. The third acquisition involved the two low cost manufacturing capacities of Terapia, which would allow Ranbaxy to leverage its new found production base in the Romanian pharmaceutical market to strengthen its presence in the European Union and the CIS markets. As a part of this deal, Ranbaxy's product portfolio has been expanded by Terapia's product basket of 157 marketing authorisations with a strong focus on the fast growing CVS, CNS & musculoskeletal therapeutic segments[24]. The fourth acquisition is in continuation of the company's strategy to strengthen its global position in the generic market. The acquisition of Ethimed, among top ten Belgium generics companies, would provide a strong manufacturing and marketing base for Ranbaxy to expand business operations in the Benelux countries[25].

Glenmark Pharmaceuticals and Sun Pharmaceutical emerged as the second aggressive overseas acquirers from Indian pharmaceutical industry with five overseas acquisitions

[20] Hindu (2003), 'Ranbaxy to buy RPG (Aventis)', Sunday, Dec 14.

[21] Express Pharma (2005), 'Ranbaxy acquires generic product portfolio from Efarmes', June 16.

[22] Business Journal of Jacksonville (2006), 'Ranbaxy buys patents for autoinjector device', March 21.

[23] Financial Express (2006), 'Ranbaxy buys GSK generic biz', Tuesday, March 28

[24] Associated Press (2006), 'Ranbaxy Laboratories to Acquire Terapia', March 29,

[25] Economic Times (2006), 'Ranbaxy acquires Belgian co', March 31.

each (Table 21). Of the five acquisitions done by Glenmark Pharmaceuticals, two are brand acquisitions and other three involve acquisition of manufacturing/marketing companies. In April 2004, Glenmark acquired a Brazilian firm, Laboratorios Klinger, for $5.2 million. The acquired entity has manpower of 176 employees and 91 sales representatives, besides one manufacturing facility. With 21 approved product registrations in Brazil, this acquisition would provide Glenmark an existing presence in branded generics and over-the-counter (OTC) drugs segment of the Brazilian market[26]. The company acquired two FDA approved products from Clonmel Healthcare Ltd. in August 2004[27], and the hormonal brand, Uno-Ciclo, from Instituto Biochimico Indústria Farmacêutica Ltda for $4.6 million in March 2005[28]. With a plan to expand business in the Argentine pharmaceutical market, Glenmark has acquired a marketing company Servycal SA engaged in cancer-related products[29]. The acquired company has a strong retail and hospital presence in Argentina and apart from Argentina, its products are registered in 12 other countries in South America. In December 2005, Glenmark acquired Bouwer Bartlett, a South African sales and marketing company, for gaining entry into the South African market, which is one of the largest and fastest growing pharmaceutical markets in Africa[30]. The acquired entity currently has a basket of 22 products mostly covering the dermatology segment and this acquisition would help the long-term strategy of Glenmark to emerge as a company having its own marketing channels for drugs.

Sun Pharmaceutical has undertaken five overseas acquisitions between 1997 and 2006 (Table 21). To enter the lucrative US generic markets, it has acquired about 30 per cent equity stakes in Detroit-based Caraco Pharm Labs in 1997[31]. The acquired company is engaged in manufacturing and marketing of generic-drugs. Subsequently additional stakes were obtained in 2002[32] and 2004[33], to increase the total holding to about 63.14 per cent. Initially, this US strategy seems to have been costly for Sun Pharmaceutical as Caraco generated large losses as compared to revenues. In 1999, its loss was $9.3 million

[26] Hindu Business Line (2004) 'Glenmark acquires Brazilian firm for Rs 22 crore', Saturday, Apr 03.
[27] Hindu Business Line (2004) 'Glenmark acquires 2 FDA-approved products from Clonmel', Tuesday, Aug 31
[28] Hindu Business Line (2005), 'Glenmark acquires hormonal brand in Brazil for $4.6 m', Friday, March 18.
[29] Hindu Business Line (2005), 'Glenmark acquires Argentine marketing firm Servycal', Thursday, October 27.
[30] Economic Times (2005) 'Glenmark takes over SA sales company', December 27.
[31] Hindu Business Line (2005), 'Sun Pharma acquires Hungarian unit of US co', Thursday, Aug 11.
[32] Hindu Business Line (2002), 'Sun Pharma to hike Caraco stake to 50%', Thursday, Oct 03.
[33] Hindu (2004) 'Sun Pharma ups stake in Caraco', Wednesday, Mar 17.

as compared to $2.89 million sales[34]. The development expenses incurred by Caraco to get Sun's generic drugs into the US market constitute a substantial part of this loss. However, twenty-four months later, this US story was a bigger success. Caraco's sales grew by 24 per cent, owing to Sun's products during the first half of 2005–06, double the growth rate of the US generics market[35]. This is impressive since the market is witnessing severe price erosion and the sales of other Indian players in the US like Ranbaxy and Dr Reddy's has fallen sharply. In September 2004, Sun Pharmaceutical purchased three brands belonging to synthetic anti-bacterial Bactrim, gynaecological Ortho-Est and the anti-migraine preparation Midrin, from US-based Women's First Healthcare for about $5.4 million[36]. In the same month, it has also bought a dosage form plant at Bryan, Ohio. As a part of its strategy to enter the European generic market, the company bought Valeant Pharma's Hungarian manufacturing facilities in August 2005[37]. In November 2005, Sun Pharma acquired the dosage form manufacturing operations of the US-based Able Laboratories for $23.15 million[38]. The deal also includes intellectual property for 40 product portfolio being marketed by Able. These acquisition strategies of manufacturing plants, brands and intellectual properties have helped the company to quickly establish its presence in the new market, move into new areas and boost its global operation.

The next group of aggressive overseas acquirers includes three Indian pharmaceutical firms, namely Dr Reddy's Laboratories, Jubilant Organosys and Stides Arcolab with four acquisitions each (Table 21). Aurobindo Pharma, Nicholas Piramal India and Wockhardt, with three acquisitions, have emerged as other important overseas acquirers. Dishman Pharmaceuticals and Matrix Laboratories have undertaken two overseas acquisitions while other firms like Kemwell, Malladi Drugs, Marksans Pharma, Natco Pharma, Suven Pharmaceuticals, Torrent Pharmaceuticals, Unichem and Zydus Cadila have one overases acquisition each. This suggests that Indian pharmaceutical firms are aggressively pursuing mergers and acquisitions route to become global players by acquiring new technology, brands and production capabilities abroad.

4.3. Contract Manufacturing and Strategic Alliances

Very recently contract manufacturing emerged as a new growth strategy for many Indian pharmaceutical companies, besides offering contract services like marketing, research,

[34] Hindu Business Line (2001), 'Sun Pharma: Buy', Sunday, February 25.

[35] Business World (2006), 'Sun Pharma: Mr Conservative gets it right', January 30.

[36] Hindu Business Line (2004), 'Sun Pharma to buy three brands from US co for $5.4 m', Saturday, Sep 25.

[37] Hindu Business Line (2005), 'Sun Pharma acquires Hungarian unit of US co', Thursday, Aug 11.

[38] Economic Times (2005), 'Sun Pharma buys Able Labs of US', December 26.

clinical trials, data management and laboratory services to global pharmaceutical companies[39]. The process of outsourcing brings substantial economic gains to large global firms as they contract the production of their products to those who can work cost-effectively and qualitatively and thus relieve them to focus on their core competencies and high value-added operations like research and marketing. Indian pharmaceutical companies with their low cost manufacturing capabilities meeting international regulatory standards, expertise in process research and easy availability of qualified workforce in India are better placed globally to get real boost from this global trend of outsourcing. For Indian firms, outsourcing and strategic alliances not only provide additional sources of revenues, but also access to new technologies, marketing networks and best business practices abroad.

A large number of Indian companies diversified into the business of contract manufacturing in the 1990s. A few names can be mentioned like Ranbaxy Laboratories, Lupin Laboratories, Nicholas Piramal, Dishman Pharmaceutical, Divi's Laboratories, Matrix Laboratories, Shasun Chemicals and Jubilant Organosys. Ranbaxy Laboratories was one of the first Indian companies to adopt the strategy of contract manufacturing, licensing and collaborative research to strengthen its competitive strength in India and overseas markets. It entered into a joint venture with Eli Lilly of USA in 1992 to market selected Lilly products in India and in 1993 Eli Lilly started sourcing Cefaclor intermediates from Ranbaxy. In 2002 Ranbaxy entered into two overseas agreements for reverse outsourcing. In June 2002, Schwarz Pharma AG of Germany announced a licensing deal with Ranbaxy to acquire the exclusive rights of developing, marketing and distributing Ranbaxy's New Chemical Entity RBx-2258 for the treatment of Benign Prostate Hyperplasia in USA, Japan and Europe[40]. As per the agreement Ranbaxy would manufacture and supply finished formulations of the product to Schwarz Pharma. Adcock Ingram formed a joint venture with Ranbaxy to obtain exclusive selling and distributing rights of Ranbaxy's range of anti-retroviral products in South Africa[41]. In February 2002, Ranbaxy Laboratories concluded an agreement with Penwest Pharmaceuticals of USA to get exclusive marketing rights of Nifedipine XL in selected markets such as China, Malaysia, Singapore, Thailand, Philippines, South Africa, and Sri

[39] India Infoline (2000), 'Contract Manufacturing: Growth Engine for Indian Pharma Companies?', August 16; Equitymaster (2003), 'Pharma outsourcing: The next big thing', August 25; India Brand Equity Foundation (2004), 'Pharma MNCs turn to India for cost management', August 6.

[40] Ranabxy (2002) 'Ranbaxy and Schwarz Pharma Sign a Deal to Develop New Drug to Treat Benign Prostate Hyperplasia', Press Release, June 27.

[41] Ranabxy (2002) 'Ranbaxy And Adcock Ingram Form Joint Venture In South Africa To Market Anti-Retroviral Products', , Press Release, October 16.

Lanka and non-exclusive rights in Mexico[42]. The agreement also provides for joint development of other controlled release products. In July 2003, Ranbaxy Laboratories announced a strategic marketing alliance with Mallinckrodt Baker Inc (MBI), USA, to market MBI JT Baker and Mallinckrodt's range of scientific laboratory products in the Indian market[43]. A collaborative research agreement was reached between Ranbaxy and 'Medicines for Malaria Venture' (MMV) of Geneva to develop anti-malarial drugs in May 2003[44]. Another collaborative research agreement with GlaxoSmithKline of UK for new drug discovery and development of new chemical entities for selected therapeutic groups using GSK's portfolio of patented molecules was reached in October 2003[45]. In June 2004 Ranbaxy obtained an exclusive licensing agreement from Atrix Laboratories to develop and commercialize the latter's product, Eligard® (leuprolide acetate for injectable suspension), in India[46].

Starting with the experience of contract supplying a key intermediate for the tuberculostatic ethambutol for American Cyanamid, Lupin Laboratories is also an early player into the business of contract manufacturing and alliances. In February 2004, Lupin entered into an agreement with Baxter Healthcare Corporation of the USA, whereby the latter will exclusively distribute Lupin's generic version of ceftriaxone sterile vials for injection in the USA market[47]. In another agreement in the same year with Allergan Inc of the US, Lupin will promote ZymarTM (gatifloxacin ophthalmic solution) in the US pediatric specialty segment[48]. In February 2006, Lupin entered into a joint venture agreement with Aspen Pharmacare Holdings of South Africa for the development, manufacture and global marketing (except US, South Africa & India) of selected Anti-TB products[49]. This joint venture is motivated to derive synergies from Lupin's strengths in

[42] Ranabxy (2002) 'Ranbaxy obtains exclusive marketing rights for nifedipine-xl from Penwest, USA also collaborates on developing other controlled release products', Press Release, February 25.

[43] Ranabxy (2003) 'Ranbaxy and Mallinckrodt Baker Inc, USA, enter into a marketing alliance in India', Press Release, July 02.

[44] Ranabxy (2003) 'Ranbaxy enters into collaborative research with 'Medicines for Malaria Venture' (MMV), Geneva, for the development of Anti-Malarial Drug', Press Release, May 19.

[45] Ranabxy (2003) **'**GSK and Ranbaxy to collaborate on drug discovery and development', Press Release, October 22.

[46] Ranabxy (2004) 'Ranbaxy and Atrix sign a licensing agreement for prostate cancer drug in India**',** Press Release, June 24.

[47] Lupin Laboratories (2004) 'Lupin enters into an alliance with Baxter for Ceftriaxone', Press Release, Feb 28.

[48] Lupin Laboratories (2004) 'Lupin Enters into Collaboration to Promote Zymar to Pediatricians in the U.S.', Press Release, March 29.

[49] Lupin Laboratories (2006) 'Lupin-Aspen sign MOU for Anti-TB Joint Venture', Press Release, February 27.

Anti-TB formulations and Active Pharmaceutical Ingredients and Aspen's a range of MDR-TB products. In March 2006, in a marketing agreement with Chester Valley Pharmaceuticals, Lupin will promote Atopiclair™ Nonsteroidal Cream to pediatricians in the US[50]. These cases show that Indian pharmaceutical firms like Lupin with their extensive sales networks and sales force in the overseas markets are entering into marketing agreements with global firms to market the latter's products.

Nicholas Piramal India is among the leaders in the contract-research and manufacturing providers from the Indian pharmaceutical industry. The company's strategies of not infringing upon the intellectual property rights of its customers and competitors and of not entering into the lucrative overseas generic markets, led to its emergence as a strong outsourcing partner for the global innovating firms based in the developed markets. In December 2003, Nicholas Piramal got a five-year outsourcing deal from Advanced Medical Optics Inc. of the US. As per the deal, Nicholas Piramal will supply the opthalmic products to the American company for developed markets like the US, Europe and Japan. Additional annual revenue in the range of around $ 15–25 million is expected from this contract manufacturing arrangement[51]. In the same year the company entered into an agreement with the US-based Minrad for exclusive distribution and marketing of a new generation of inhalation anesthetic products[52]. Nicholas Piramal through its distributors and marketing agents would market three products, namely Isoflurane, Enflurane and Sevoflurane in Russia, Ukraine, Nigeria, Kenya, Sudan, Syria, Jordan, Iran, Eygpt and Bangladesh. The year 2004 has seen Nicholas Piramal entering into strategic alliance with Pierre Fabre of France to exclusively sell the latter's dermatology-related or skincare products in India[53] and getting two new custom manufacturing agreements from two US drug companies, which are expected to add $30 million revenues per annum[54]. One contract deal is from Allergan Inc of the US to whom Nicholas Piramal would supply two eye-related, anti-glaucoma active pharmaceutical ingredients, namely Levobunolol and Brimonidine. In November 2005, AstraZeneca AB, Sweden, signed a development and know-how agreement with Nicholas Piramal. As per this agreement, Nicholas Piramal is chosen as a partner in development of processes for the manufacture

[50] Lupin Laboratories (2006) 'Lupin's US Subsidiary Enters Into Collaboration to Promote Atopiclair™', Press Release, March 3.

[51] Financial Express (2003), 'NPIL In Outsourcing Deal With Advanced Medical Optics', Wednesday, December 10.

[52] Nicholas Piramal (2003), 'Nicholas Piramal to market Minrad's new generation inhalation anesthetics in 10 countries', January 31.

[53] Hindu Business Line (2004), 'NPIL inks deal with French firm for skincare products', Jun 08.

[54] Hindu Business Line (2004), 'NPIL inks two custom mfg contracts', November 04.

of intermediates, active ingredients or bulk drugs for supply to AstraZeneca[55]. In December 2005, a long-term contract manufacturing agreement between Pfizer International LLC and Nicholas Piramal was signed for animal health products[56]. Under this agreement, Nicholas Piramal will develop processes for Pfizer, provide scale-up batches for Phase trials and contract manufacture after the product is launched.

A pure contract-manufacturing player, Dishman Pharmaceuticals, signed its first contract manufacturing agreement with Solvay Pharmaceuticals of Netherlands in 2001 for production and supply of an active ingredient of an anti-hypertension drug, Teveten, still under patent. This was the first case of a patented molecule to be manufactured in India on a contract basis. The contract is for eight years with an estimated value of more than $10 million[57]. Since then it is providing contract services to a growing number of global pharmaceutical firms including AstraZeneca, GlaxoSmithKline and Merck. In July 2005, Dishman entered into an agreement with NU SCAAN of the UK to develop and manufacture bulk actives for nutraceutical products of NU Scaan[58].

Shasun Chemicals and Drugs is another aggressive contract manufacturer from the industry. In the third quarter that ended on December 2005, contract research and manufacturing business contributed about 12 per cent of the turnover of the company[59]. The company, which had experience of contract manufacturing for Indian companies such as Ranbaxy Laboratories and Glenmark has expanded its focus to foreign pharmaceutical companies since 1999. It has entered into a joint venture with the US-based company, Austin Chemical, in December 1999. The primary focus of the venture is on joint process development and custom manufacturing to serve multinational pharmaceutical companies operating in the regulated American market. In June 2004, it had entered into a strategic partnership with another US firm, Eastman Chemical, to collaborate on the development and manufacture of performance chemicals for the pharmaceutical industry[60]. In May 2005, US firm Codexis and Shasun entered into a manufacturing and supply agreement under which Shashun will manufacture the intermediate for a generic drug and Codexis will market the products worldwide to the

[55] Express Pharma (2005), 'AstraZeneca, Nicholas Piramal clinch R&D pact', 16-30 November.
[56] Hindu Business Line (2005), 'NPIL-Pfizer deal on animal health products', Dec 27.
[57] Hindu Business Line (2001) 'Dishman inks supply pact with Dutch co', March 22.
[58] Express Pharma (2005) 'Dishman Pharma enters into an agreement with NU SCAAN, UK', July 05.
[59] Hindu Business Line (2006) 'Shasun Chemicals net up 43 pc', Saturday, Jan 21.
[60] Hindu Business Line (2004) 'Shasun, Eastman Chemical in tie-up — To make performance chemicals for pharma cos', Wednesday, Jun 16.

generic pharmaceutical industry[61]. The company has other strategic partnerships for supplying ranitidine (anti-ulcer drug) and ibuprofen (anti-inflammatory pain reducer) to the US-based Apotex and for anti TB drugs with Eli Lilly.

The above discussed cases demonstrate that Indian pharmaceutical companies have adopted contract manufacturing as a means of expanding overseas business links and very recently this has taken the form of contract research services to big multinationals companies. This technological partnership with global players has been seen across the firms, irrespective of size differences. The most recent example of strategic technological agreement is the case of Jubilant Organosys entering into a five-year R&D contract with Eli Lilly in January 2006[62]. Under this agreement, Jubilant would provide a range of collaborative drug discovery services to Eli Lilly, the US-based pharmaceuticals company. These growing numbers of R&D contracts not only acknowledge the research capabilities of Indian companies, but also provide them with technological learning to emerge as global players albeit in cooperative relationship with global companies from developed countries.

4.4. Raising Resources Abroad

In 1990s, Indian pharmaceutical firms have increasingly drawn on the global avenues of financing for their growth. As increasing number of Indian firms are setting up subsidiaries abroad or going for inorganic growth through overseas acquisitions, they need to raise resources for these purposes. In true sense of internationalization, their finance-raising activities have spilled over the national boundary. A large number of firms have raised resources abroad by issuing Foreign Currency Convertible Bonds (FCCBs) and from foreign capital markets like Luxembourg, New York, London, and Singapore by sponsoring GDRs (Global Depository Receipts) and/or ADRs (American Depository Receipts) (Table 22). Since Indian pharmaceutical firms already have good business record and brand image in the regulated markets, tapping the global financial markets becomes easier for them. A good number of firms including Ranbaxy Laboratories, Dr Reddy's Laboratories, Matrix Laboratories, Sun Pharmaceuticals, Nicholas Piramal India, Cipla, Jubilant Organosys, Strides Arcolab, Lupin, Glenmark Pharmaceuticals, Cadila Healthcare, Wockhardt Ltd, Biocon, Dishman Pharmaceuticals and Torrent Pharma have been observed to have raised resources abroad in recent years.

[61] Hindu (2005) 'Shasun Chemicals pact with Codexis of U.S.', Thursday, May 12.

[62] Economic Times (2006) 'Jubilant in 5-yr contract with Eli Lilly', January 04.

Table 22
Foreign Resource Mobilization by Indian Pharmaceutical Companies

Month	*Year*	*Company*	*Amount (US $ million)*	*ADR / GDR / FCCB / Borrowing*	*Listing Stock Market*
	1994	Dr.Reddy's Laboratories	48	GDR	New York Stock Exchange
June	1994	Ranbaxy Laboratories	100	GDR	Luxembourg Stock Exchange
May	2001	Orchid Chemicals and Pharmaceuticals	20	FCCB	
March	2003	Morepen Laboratories	15.25	GDR	Luxembourg Stock Exchange
April	2003	Neuland Laboratories	1.5	Loan from an international customers	
June	2003	Nicholas Piramal India Ltd	10	ECB	
April	2004	Jubilant Organosys	55	A combination of ADR, FCCB and the private placement route	
April	2004	Orchid Chemicals and Pharmaceuticals	75	FCCB	
June	2004	Dishman Pharmaceuticals and Chemicals	22	ECB in euros and loan-denominated Indian Rupee	
September	2004	Sterling Biotech Limited	70	FCCB	Luxembourg Stock Exchange
October	2004	Wockhardt Ltd.	100	FCCB	
November	2004	Sun Pharmaceutical	225	FCCB	Singapore Stock Exchange
December	2004	Glenmark Pharmaceuticals Ltd	100	FCCB	

Table 22 Continued

Month	*Year*	*Company*	*Amount (US $ million)*	*ADR / GDR / FCCB / Borrowing*	*Listing Stock Market*
December	2004	Natco Pharma Ltd	13.5	FCCB	Luxembourg Stock Exchange
December	2004	Sun Pharmaceutical	350	FCCB	
February	2005	Strides Arcolab	40	FCCB	
February	2005	Glenmark Pharmaceuticals Ltd	70	FCCB	Singapore Stock Exchange
July	2005	Aurobindo Pharma Ltd	60	FCCB	
August	2005	Ind Swift Laboratories	10.625	GDR	Luxembourg Stock Exchange
June	2005	Orchid Chemicals and Pharmaceuticals	100	GDR	
December	2005	Lupin Limited	100	FCCB	Singapore Stock Exchange.
February	2006	Ranbaxy Laboratories	400	FCCB	
Total			1986		

Note: GDR- Global Depository Receipts; ADR- American Depository Receipts; FCCB- Foreign Currency Convertible Bond, ECB- External Commercial Borrowings.

Source: Based on various Indian financial newspapers

5. Conclusions and Policy Options

It has been a long journey for the Indian pharmaceutical industry from being merely an import dependent to emerge as a self-reliant producer and later as an innovation-driven developing country competitor in the global market. The government of India has employed a variety of policy tools to develop the domestic pharmaceutical sector and to protect it from large multinational firms operating in and dominating the industry. The starting of public sector pharmaceutical companies for indigenous production of drugs has been the initial form of government intervention. Later, a soft patent regime was adopted since 1970, which led the domestic sector on a new technological trajectory and as a result, a technologically vibrant domestic sector with remarkable technological capabilities to develop new cost-effective processes and new drug delivery systems has emerged. This technological growth has also been contributed partly by the progress that India achieved in building its scientific, managerial, and general skills, which are readily and cheaply available to the industry for productive purposes. These national policies, thus, have contributed to the rise of the Indian pharmaceutical industry and to make it competitive in the world markets as among the cheapest producers of drugs internationally.

While the Indian policy regime has succeeded in bringing out its pharmaceutical sector as among the fastest growing in the world, but it has also created its own limitations in pushing forward its productivity and technological activities. The fragmented nature of policy that had encouraged a large number of small- and medium-sized pharmaceutical firms appears to have placed a constraint on the scale of production and capabilities to further upgrade the technological strength. Due to these factors, productivity and R&D intensity of the Indian pharmaceutical industry is lowest among countries. Although, India has consistently enjoyed a favourable trade balance in pharmaceutical products, its export share is still hovering around just one per cent.

The policy liberalization of the past decade or so like liberalization of foreign investment, trade and industrial policy and shift towards a strong patent regime postulated by the TRIPs at the global, regional, bilateral levels and across individual countries has opened up new competitive challenges for the Indian pharmaceutical sector. Many Indian pharmaceutical firms are adopting new internationalization strategies for meeting such challenges and achieve their goal for global growth. They are strengthening their geographical presence by starting their own subsidiaries and affiliates in different strategic overseas markets. Apart from undertaking green-field investments, they are also aggressively acquiring overseas business enterprises, brands and research facilities.

Strategic alliances with and contract manufacturing, R&D and marketing for pharmaceutical companies from developed countries are also being employed by Indian pharmaceutical companies. For financing their global expansion, Indian pharmaceutical firms have been increasingly entering into global securities and finance markets.

The Indian government can take several policy measures for enhancing the nation's competitiveness in the pharmaceutical sectors. A fragmented domestic market marked by a lower degree of domestic competition is not conducive for global competitiveness. Hence, policy measures are needed to encourage mergers and acquisitions among domestic firms to offset the scale disadvantage and to overcome the trap of low R&D intensity. Increases in average firm size through M&As until the concentration index of the Indian pharmaceutical industry rises significantly, may result in improving India's competitive advantages in the pharmaceutical sector. Government policies that encourage overseas acquisitions by the Indian companies for brands, technology and market access can also be important for strengthening firms' technological capabilities. Incentives and facilitation policies for encouraging global pharmaceutical companies to outsource their production and R&D works to Indian firms shall be put in place. Data protection, investment and tax allowances for the outsourced production and R&D works, etc can be useful policies. The provision of low cost finance for research with subsidy facilities for indigenous research activities continues to be a key to competitive strategy.

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